The world's most comprehensive encyclopedia of the military weapons of the 20th century

WAR MACHINE

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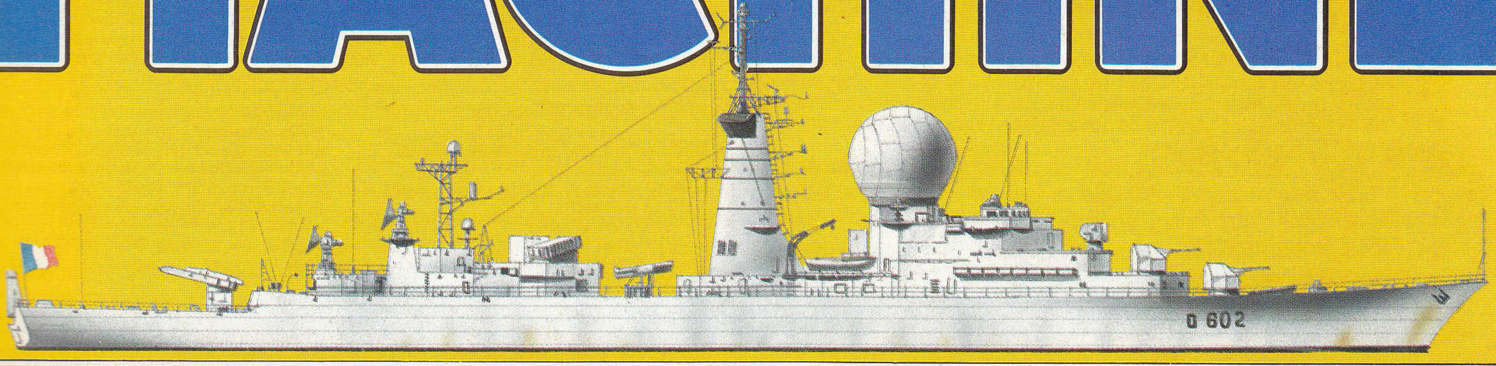
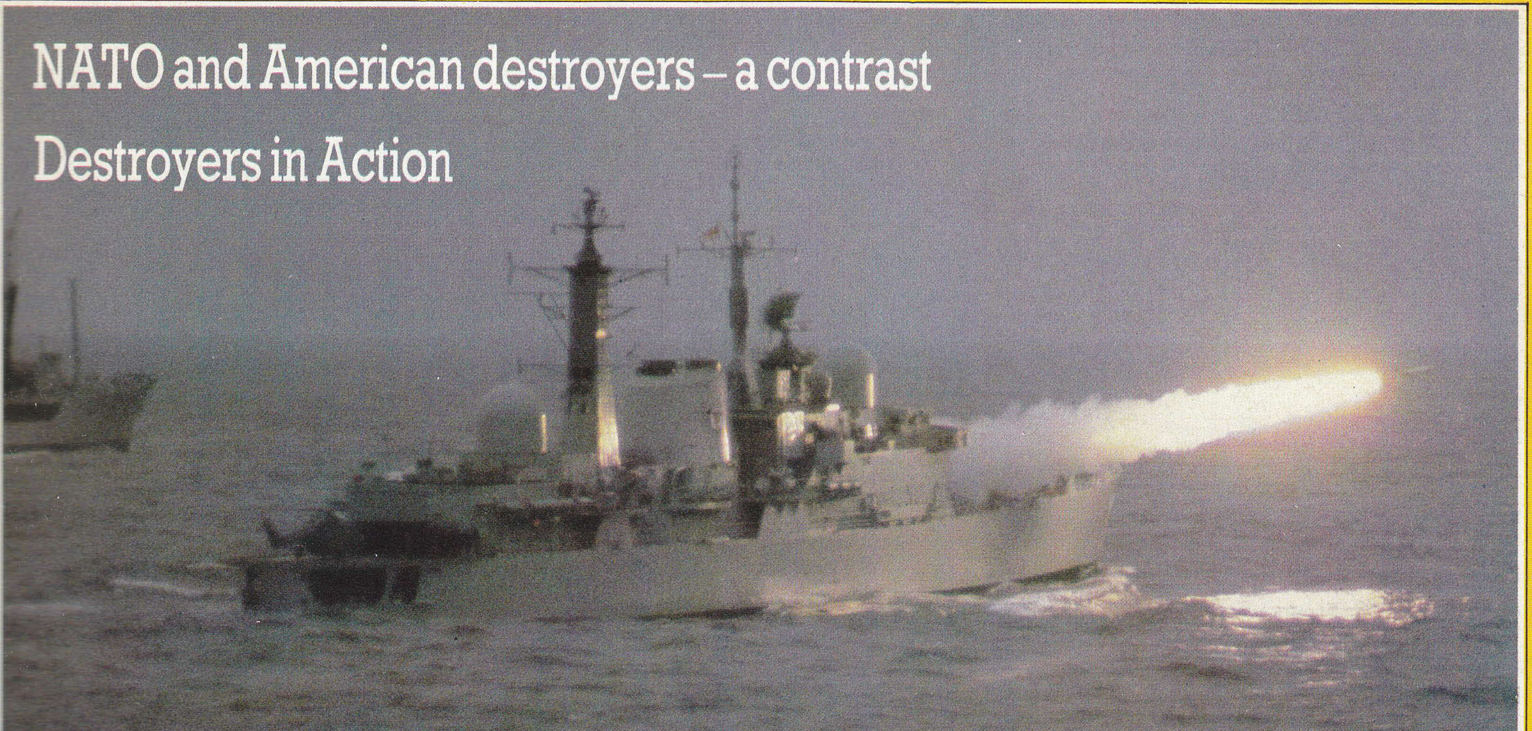


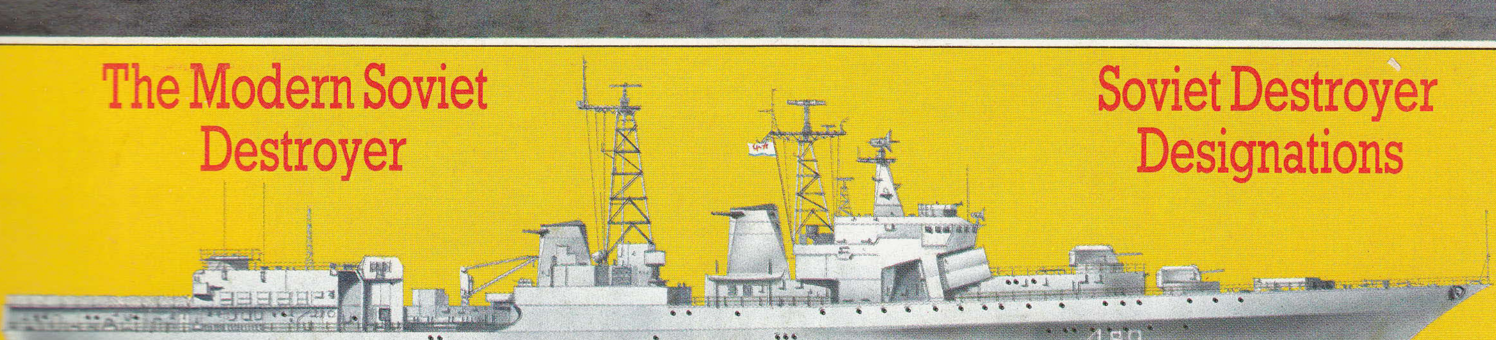


NATO and American destroyers – a contrast

Destroyers in Action

The Modern Soviet Destroyer

Soviet Destroyer Designations



A fully illustrated guide to Modern Destroyers

WAR MACHINE

Volume 4 Issue 44

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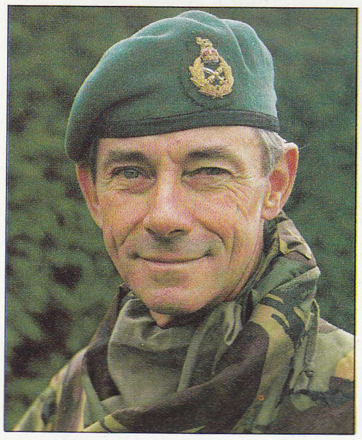

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WAR MACHINE
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Modern Light Vehicles
Modern Anti-tank Weapons
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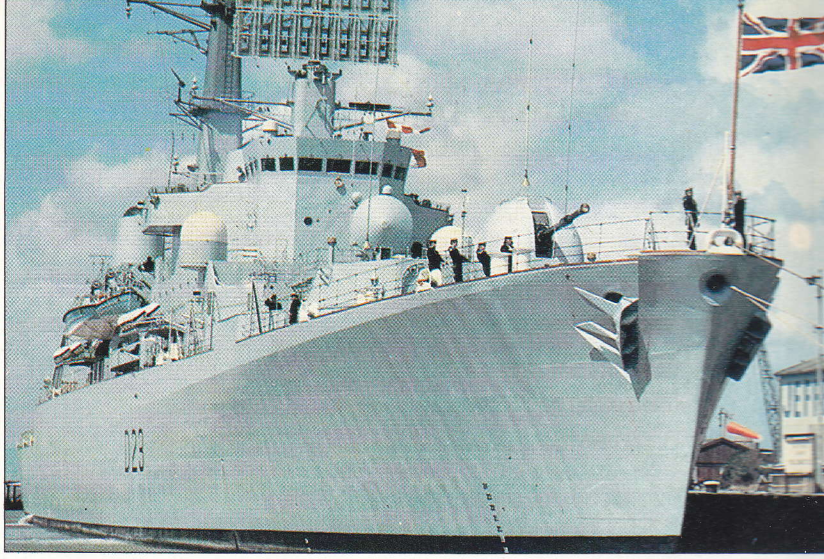
Modern Destroyers

The modern destroyer would hardly be recognizable to one familiar with the classic gun- and torpedo-armed vessels of World War II. Even the term 'destroyer' is somewhat loose, covering as it does vessels ranging from the small, gun-armed 'Kotlin' class of the Soviet navy up to the Soviet 'Sovremenny' and American 'Spruance' and 'Kidd' classes, each as large as light cruisers of the 1940s.



Conceived as an escort to the cancelled British 'CVA-01' carrier, HMS Bristol *was the first vessel to be armed with the Sea Dart missile system. The cancellation of the carrier, and cost constraints, meant that her successors would be the much smaller and less capable 'Type 42' class.*

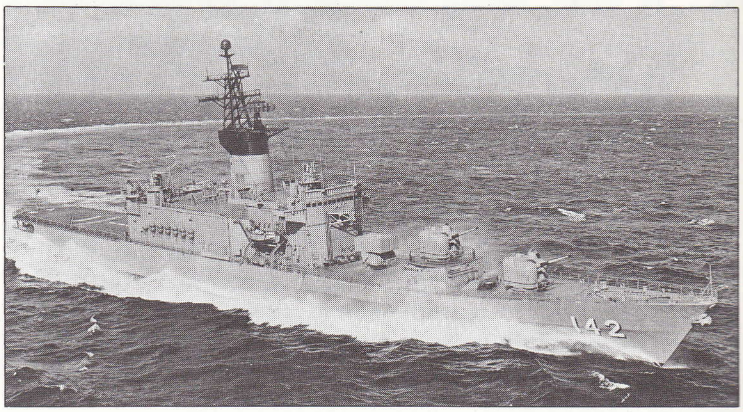
Since World War II the destroyer has evolved from a torpedo-armed, all-gun surface warfare vessel into a specialist anti-air or anti-submarine warfare ship capable either of independent operations for a short time or of operating as an escort in a task force. The losses suffered by the Navy's destroyers during the Falklands conflict proved to NATO that the UK's minimally armed warships, which had been thus constructed to satisfy the monetary constraints imposed by the Treasury for political reasons, were extremely vulnerable in a conventional war, let alone the nuclear scenarios proposed for the North Atlantic theatre of operations. Unfortunately the mistakes inherent in the destroyers' design will be around for a few more years yet until the ships are scrapped. Short-term plans to rectify some of the faults (such as the inadequate numbers of close-range defence weapons) are already being implemented, but are no real substitute for well designed ships as seen in other navies. For instance, the Soviets are building specialist classes for both the ASW and surface ship warfare roles, whilst the Americans, with their 'Spruance' class, have managed to produce the most capable ASW destroyer yet built. Modifying this design for the anti-air warfare role has produced the 'Kidd' class ships, which are the most powerfully armed general-purpose destroyers in the world. The new 'Arleigh Burke' design will take excellence even further up the scale. The French in the meantime have followed their own way to take the 'Spruance' and 'Kidd' concept yet further in producing a single hull design and then fitting it out (even to the engine fit) to suit the role asigned to it. The 'Type C70' which has resulted from this policy will be the mainstay of the French destroyer force for a considerable number of years to come. Other navies have tended to follow the USA in either buying new-build ships from that source or taking American technology and building it into their own designs. Very few have bought new-build British ships, but instead have tended to rely on getting such units as second-hand items as they are discarded from the Royal Navy.

The first post-war US destroyer design, the 'Forrest Sherman' class, dates from the mid-1950s. Originally gun-armed destroyers, four were converted to guided missile configuration in the mid-1960s. USS Somers *was the last of the class to be modified, recommissioning in 1968.*

JAPAN

'Haruna' and 'Shirane' classes

The **'Haruna' class** and follow-on improved **'Shirane' class** are the only destroyer-sized ships in the world which can carry and operate three large Sea King ASW helicopters. Both ship classes were built with strong ASW armaments and are weaker than most Western designs in both anti-air and anti-surface warfare systems, although they are to be modernized within the next few years with systems such as the Harpoon SSM and the 20-mm Phalanx CIWS to help rectify these shortcomings. The 'Haruna' class, ***Haruna*** (DDH141) and ***Hiei*** (DDH142), have continuous superstructures with their single combined radar mast and funnel (known as a 'mack') offset to port to allow space for the third helicopter in the hangar. The later 'Shirane' class units, ***Shirane*** (DDH143) and ***Kurama*** (DDH144) have a broken superstructure with two 'macks', one offset to port atop the main superstructure forward and the other atop the detached hangar aft. For landing the helicopters in most weather conditions they are fitted with the Canadian Bear Trap hauldown system, whilst to reduce their underwater radiated noise levels from the main propulsion machinery they adopted the 'Masker' bubble-generating system: this forms a continuous curtain of minute air bubbles over the parts of the hull beneath the machinery spaces with the bubbles acting as a sound-damping layer. A further class of large helicopter-carrying destroyers is expected within the next few years.



Hiei (DDH 142) executes a turn to port at high speed. The lack of any air defence systems, apart from the 127-mm (5-in) dual-purpose gun mounts, is readily apparent, although it is hoped that a Sea Sparrow SAM system will be fitted in the future.

Specification

'Haruna' class

Displacement: 4,700 tons standard and 6,300 tons full load

Dimensions: length 153.0 m (502 ft); beam 17.5 m (57 ft 5 in); draught 5.1 m (16 ft 9 in)

Machinery: geared steam turbines delivering 70,000 shp (52,200 kW) to two shafts

Speed: 32 kts

Aircraft: three Mitsubishi-Sikorsky SH-3 Sea King ASW helicopters

Armament: two quadruple Harpoon SSM launchers (no reloads, to be fitted), one octuple Sea Sparrow SAM launcher (no reloads, being fitted), two single 127-mm (5-in) DP guns, two 20-mm Phalanx CIWS (being fitted), one octuple ASROC ASW missile launcher (16 missiles), and two triple 324-mm (12.75-in) Type 68 ASW torpedo tubes (6 Mk 46 torpedoes)

Electronics: one SPS-52B 3D radar, one OPS-17 surface-search radar, two Type 72 gun fire-control radars, one WM-25 missile fire-control radar (being fitted), one URN-20 TACAN, one ESM suite, one OQS-3 hull sonar, and one SQS-35(J) variable-depth sonar

Complement: 340

Specification

'Shirane' class

Displacement: 5,200 tons standard and 6,800 tons full load

Dimensions: length 158.8 m (521 ft); beam 17.5 m (57 ft 5 in); draught 5.3 m (17 ft 5 in)

Machinery: geared steam turbines delivering 70,000 shp (52200 kW) to two shafts

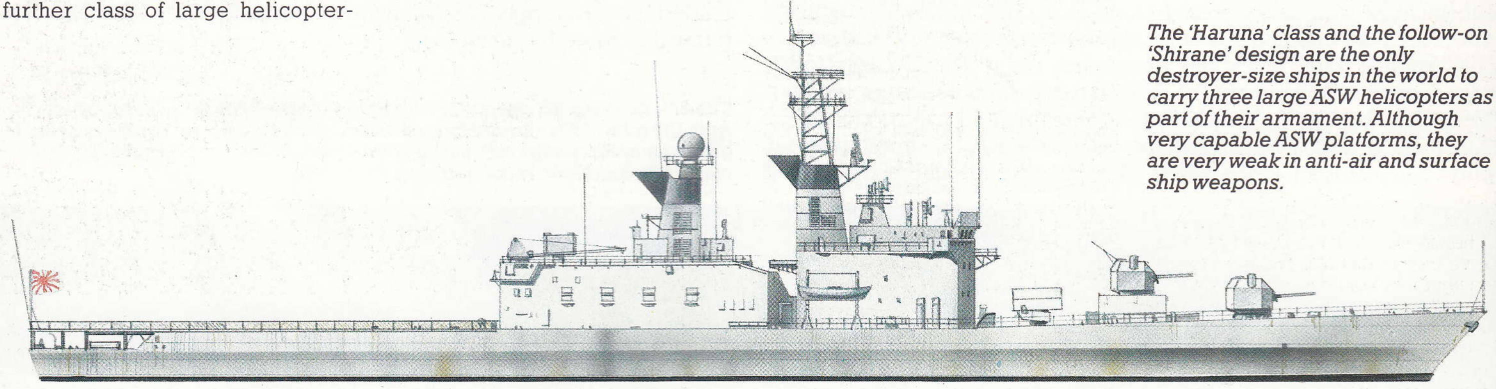
Speed: 32 kts

Aircraft: as 'Haruna' class

Armament: as Modernized 'Haruna' class

Electronics: one OPS-12 3D radar, one OPS-28 surface-search radar, one OPS-22 navigation radar, one WM-25 missile fire-control radar, two Type 72 gun fire-control radars, one URN-20A TACAN, one ESM suite, one OQS-101 hull sonar, one SQR-18A towed-array sonar, and one SQS-35(J) variable-depth sonar

Complement: 370



The 'Haruna' class and the follow-on 'Shirane' design are the only destroyer-size ships in the world to carry three large ASW helicopters as part of their armament. Although very capable ASW platforms, they are very weak in anti-air and surface ship weapons.

JAPAN

'Tachikaze', 'Takatsuki' and 'Hatsuyuki' classes

In order of building, the **'Takatsuki' class** was the first of these three classes to be constructed. Comprising the ***Takatsuki*** (DD164), ***Kikuzuki*** (DD165), ***Mochizuki*** (DD166) and ***Nagatsuki*** (DD167), the class has a typical American appearance in having two single 127-mm (5-in) guns and an ASROC ASW missile launcher. They originally carried and operated the American ASW DASH system for which they carried a hangar aft for three QH-50 drones. Although DASH was unsuccessful in American service, it proved successful in the Japanese navy, and was retired from service with this class only in 1977. The four ships are currently undergoing major refits both to enhance their already formidable ASW armament and to improve their weak anti-air and anti-surface armaments.

During the early 1970s the Japanese Maritime Self-Defense Force needed to improve its medium-range area-defence SAM capabilities and thus laid down the three **'Tachikaze' class** ships at three-yearly intervals from 1973. These vessels are the ***Tachikaze*** (DDG168), ***Asakaze*** (DDG169) and ***Sawakaze*** (DDG170) and commissioned in 1976, 1979 and 1982 respectively. They each carry a single-rail Mk 13 launcher for the Standard SM-1MR missile. No helicopter facilities are provided, and the ASW armament is confined to ASROC missiles and Mk 46 self-defence torpedoes. In order to save on construction costs the class adopted the propulsion plant and machinery of the 'Haruna' class of helicopter-carrying ASW destroyers.

The **'Hatsuyuki' class** was ordered in the mid-1970s as a gas turbine-powered multi-purpose design with a balanced anti-air, anti-ship and anti-submarine sensor and armament fit from the outset. An aluminium-alloy superstructure is used. Five ships from an eventual 12-ship class were in service by 1983, namely the ***Hatsuyuki*** (DD122), ***Shirayuki*** (DD123), ***Mineyuki*** (DD124), ***Sawayuki*** (DD125) and ***Hamayuki*** (DD126), with the remainder due to commission at regular intervals up to 1987. A slightly larger **'Improved Hatsuyuki' class** with steel superstructure is due for the late 1980s.

Designed to enhance the Japanese Maritime Self-Defense Forces anti-aircraft defences, the guided-missile destroyer Tachikaze *(DDG 168) and her two sisters carry a single-rail Mk 13 Standard MR-1 SAM system aft to provide area defence.*

Specification

'Takatsuki' class

Displacement: (DD164-165) 3,050 tons standard and 4,500 tons full load;

(DD166-167) 3,100 tons standard and 4,500 tons full load
Dimensions: length 136.0 m (446 ft 2 in); beam 13.4 m (44 ft); draught 4.4 m (14 ft 5 in)
Machinery: geared steam turbines delivering 60,000 shp (44740 kW) to two shafts
Speed: 32 kts
Aircraft: helicopter landing platform (DD166-167 only)
Armament: (DD164-165) two quadruple Harpoon SSM launchers (no reloads), one octuple Sea Sparrow SAM launcher (no reloads), one single 127-mm (5-in) DP gun, provision for two 20-mm Phalanx CIWS mountings, one octuple ASROC ASW missile launcher (16 missiles), one Type 71 375-mm (14.76-in) Bofors ASW rocket launcher (36 rockets), and two triple Type 68 324-mm (12.75-in) ASW torpedo tubes (6 Mk 46 torpedoes)
Armament: (DD166-167) two single 127-mm (5-in) DP guns, one octuple ASROC ASW missile launcher (16 missiles), one Type 71 375-mm (14.76-in) Bofors ASW rocket launcher (36 rockets), and two triple Type 68 324-mm (12.75-in) ASW torpedo tubes (6 Mk 46 torpedoes)
Electronics: one OPS-11B air-search radar, one OPS-17 surface-search radar, two Mk 56 fire-control radars (Type 72 in DD167), one URN-20 TACAN (not in DD165), one NOLR-1B ECM system (NOLQ-1 in DD165-166 with Mk 36 Super RBOC chaff launchers), one OQS-3 hull sonar, one SQS-35(J) variable-depth sonar (DD166-167 only) and one SQR-18A towed-array sonar (DD164-165 only)
Complement: 270

Specification
'Tachikaze' class
Displacement: (DD168-169) 3,850 tons standard and 4,800 tons full load; (DD170) 3,950 tons standard and 4,800 tons full load
Dimensions: length 143.0 m (469 ft 2 in); beam 14.3 m (46 ft 11 in); draught 4.6 m (15 ft 1 in)
Machinery: geared steam turbines delivering 70,000 shp (52200 kW) to two shafts
Speed: 32 kts
Armament: two quadruple Harpoon SSM launchers (no reloads, in DD170 only), one single-rail Mk 13 Standard SM-1MR launcher (40 missiles), two single 127-mm (5-in) DP guns, one 20-mm Phalanx CIWS mounting (being fitted), one octuple ASROC ASW missile launcher (16 missiles), and two triple Type 68 324-mm (12.75-in) ASW torpedo tubes (6 Mk 46 torpedoes)
Electronics: one SPS-52B 3D radar, one OPS-11B (OPS-28 in DD170) air-search radar, one OPS-17 surface-search radar, two SPG-51C Standard fire-control radars, two Type 72 gun fire-control radars, two SATCOMM communications systems, one OLT-3 ESM suite, four Mk 36 Super RBOC chaff launchers, and one OQS-3 (OQS-4 in DD170) hull sonar
Complement: 260 in DD168, 250 in DD169 and 270 in DD170

Specification
'Hatsuyuki' class
Displacement: 2,950 tons standard and 3,700 tons full load
Dimensions: length 131.7 m (432 ft 1 in); beam 13.7 m (45 ft); draught 4.3 m (14 ft 2 in)
Machinery: two Rolls-Royce Olympus TM3B gas turbines delivering 45,000 shp (3355 kW) and two Rolls-Royce Tyne RM1C gas turbines delivering 10,680 shp (7965 kW) in a COGOG arrangement to two shafts
Speed: 30 kts
Aircraft: one Mitsubishi-Sikorsky SH-3 Sea King ASW helicopter
Armament: two quadruple Harpoon SSM launchers (no reloads), one octuple Sea Sparrow SAM launcher (no reloads), one single 76-mm (3-in) DP guns, two 20-mm Phalanx CIWS mountings, one octuple ASROC ASW missile launcher (16 missiles), and two triple Type 68 324-mm (12.75-in) ASW torpedo tubes (6 Mk 46 torpedoes)
Electronics: one OPS-14B air-search radar, one OPS-18 surface-search radar, one FCS2 missile fire-control radar, one GFCS2 gun fire-control radar, one ECM suite, and one OQS-4 hull sonar
Complement: 190

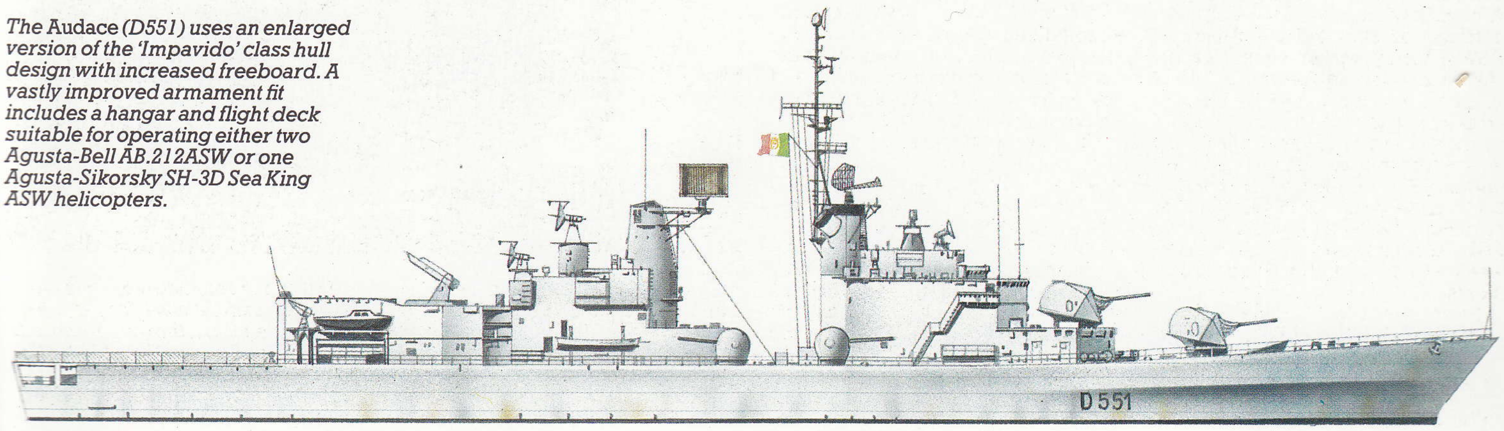
ITALY

'Audace' class

The 'Audace' class, by use of modern lightweight weapon systems and the mounting of a Mk 13 SAM launcher atop the hangar, has greater capabilities in almost every respect (save the number of helicopters carried) than the 'Andrea Doria' class.

Essentially an enlarged version of the 'Impavido' class hull design with greatly improved armament and an increased freeboard, the ***Audace*** (D551) and ***Ardito*** (D550) have proved to be excellent ships in terms of habitability and seaworthiness, so much so that two further units of an **'Improved Audace' class** design are currently awaiting funding to replace the two recently deleted 'Impetuoso' class destroyers. In terms of capabilities the two **'Audace' class** units improve on the 'Andrea Doria' class of helicopter carriers in almost every respect save the number of helicopters carried. They are to receive the Otomat Mk 2 SSM system in the near future, and are relatively rare in NATO service in having four stern-mounted 533-mm (21-in) torpedo tubes for dual-role long-range wire-guided active/passive acoustic-homing A184 torpedoes as well as self-defence 324-mm (12.75-in) tubes for American Mk 46 ASW torpedoes. The Whitehead A184 is a dual-role 1300-kg (2866-lb) weapon with a range of around 14 km (8.7 miles). The two embarked ASW helicopters carry both Mk 44 and Mk 46 torpedoes, American Mk 54 depth bombs, dipping sonar and sonobuoys for use against sub-surface targets, and the French AS.12 missile for use against surface targets. The helicopters are also being provided with the capability to provide mid-course guidance for the Otomat missiles during 'over-the-horizon' missile engagements.

Specification
'Audace' class
Displacement: 3,950 tons standard and 4,559 tons full load
Dimensions: length 136.6 m (448 ft); beam 14.23 m (46 ft 8 in); draught 4.6 m (15 ft)
Machinery: geared steam turbines delivering 73,000 shp (54,435 kW) to two shafts
Speed: 33 kts
Aircraft: two Agusta-Bell AB.212ASW helicopters or one Agusta-Sikorsky SH-3D Sea King ASW helicopter
Armament: one single-rail Mk 13 Standard SM-1MR SAM launcher (40 missiles), two single 127-mm (5-in) DP guns, four single 76-mm (3-in) AA guns, two triple 324-mm (12.75-in) ILAS-3 ASW torpedo tubes (12 Mk 46 torpedoes), and two twin 533-mm (21-in) torpedo tubes (12 A184 torpedoes)
Electronics: one SPS-52 3D radar, one RAN20S air-search radar, one SPQ2 air- and surface-search radar, two SPG-51B Standard fire-control radars, one 3RM20 navigation radar, one ESM suite, two 20-barrel SCLAR chaff and IR decoy launchers, and one CWE610 hull sonar
Complement: 380



The Audace (D551) uses an enlarged version of the 'Impavido' class hull design with increased freeboard. A vastly improved armament fit includes a hangar and flight deck suitable for operating either two Agusta-Bell AB.212ASW or one Agusta-Sikorsky SH-3D Sea King ASW helicopters.

Destroyers in Action

Since 1945, destroyers have been in action on a number of occasions. Duties have ranged from air defence to shore bombardment, but fighting has largely been carried out by World War II vintage vessels. Not until 1982 and the Falklands conflict did modern-style naval forces come to battle.

Although the first major combat use of the destroyer since World War II occurred during the 1950-3 Korean War, the type saw action before this with the Royal Navy in two international incidents. The first occurred in October 1946, when the two Royal Navy destroyers HMS *Saumarez* and HMS *Volage* were mined by the Albanians in the Corfu channel, the damage being so extensive in the first ship's case that it was eventually scrapped. In the second incident, which took place in 1949, the destroyer HMS *Consort* attempted with other ships to relieve the frigate HMS *Amethyst* that had been trapped in the Yangtze river by Communist Chinese artillery during the later stages of the Chinese Civil War. Considerable damage and personnel losses were suffered by the destroyers during these actions. The Korean War saw the destroyers of a number of Western nations involved in the provision of fire support to the United Nations forces ashore and in patrolling the Korean coastline for North Korean activities such as minelaying or movement of supplies. During these operations the deadliest weapons they faced were coastal defence artillery and sea mines.

By 1956, when the Suez landings took place, the British and French warships that took part (including a number of destroyers) were expecting to face the additional hazards of torpedo craft and air attack as the spread of comparatively modern Soviet and Czech arms in the Middle East increased. It was during this conflict that the two ex-British destroyers *Eilat* and *Yaffa* of the Israeli navy took part in a rare naval event of the 20th century, the capture of an enemy warship, in this case the Egyptian frigate *Ibrahim el Awal* after it had bombarded Israeli naval targets around the port of Haifa. Ironically it was the attack on two ex-World War II destroyers by North Vietnamese torpedo attack craft that officially brought the Americans into the long drawn-out Indo-China war. The destroyers, the USS *Madox* and the USS *Turner Joy*, fought off the attacks with gunfire and the help of carrier aircraft. The war in Vietnam allowed the widespread use of both ex-World War II destroyers and new-build ships in a variety of roles including air direction, naval gunfire support and intelligence gathering. The June 1967 war in the Middle East between Israel and her Arab neighbours resulted in one of the last classic gun actions for destroyers when in July 1967 the *Eilat* and two Israeli torpedo boats caught and destroyed two Egyptian 'P6' class MTBs off the Sinai coast. Retribution was not long in coming, for the *Eilat* was sunk after being hit by three out of four 'Styx' anti-ship missiles some 17 km (10.6 miles) off Port Said. This sinking, on 21 October, was achieved by two Egyptian 'Komar' class missile boats supplied by the Soviets and which did not even have to leave the harbour. It was the dawn of a completely new form of naval warfare.

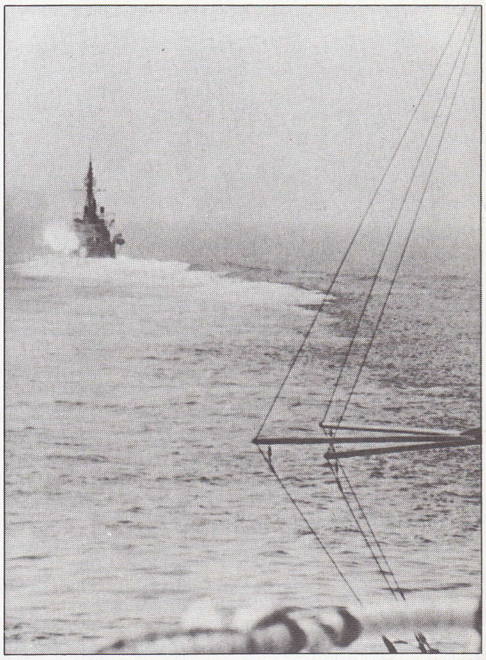
Naval response to the missile threat was spurred four years later during the Indo-Pakistan War, when the Indian navy's Western Fleet deployed a mix of large surface units and 'Osa' missile craft for an attack on Pakistani navy units off Karachi in the largest surface action since 1945 before bombarding and rocketing the naval base itself. In the battle the Indian 'Styx' missiles sank a minesweeper and the destroyer PNS *Khaibar* as well as damaging other vessels. Further evidence for the demise of the classic destroyer concept was provided in 1972 during the North Vietnamese offensive into South Vietnam, when an ex-World War II destroyer, the 'Gearing' class unit USS *Higbee*, became the first US warship to suffer damage in the war from an enemy air attack when a MiG fighter-bomber scored a direct hit with a 250-kg (551-lb) high-explosive bomb on one of its 127-mm (5-in) gun mounts. In 1974 the lack of adequate anti-aircraft protection and the vulnerability of such ex-World War II veterans was further highlighted in perhaps what was one of the most ironic losses to have occurred in conflict since 1945, when the Turkish destroyer *Kocatepe*, an ex-American 'Gearing' class vessel, was bombed and rocketed in error by Turkish air force jets when they mistook her for an identical Greek navy 'Gearing' class destroyer trying to interdict the Turkish amphibious landings then under way on the island of Cyprus. The Greek fleet in the meantime remained well away from the Turkish theatre of operations.

Modern warfare

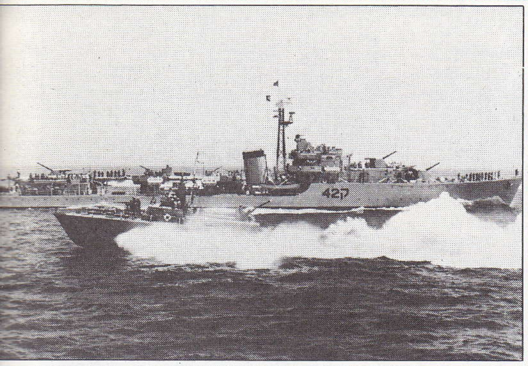
However, it was not until 1982 that the first of the modern style destroyers was committed to battle when the Anglo-Argentine war broke out over the Falkland Islands. In the British force committed to the South Atlantic operations were five 'Type 42' and two 'County' class destroyers, whilst the Argentine fleet included two 'Type 42' class and five assorted ex-World War II American destroyers. Of the British units both the 'County' class vessels, HMS *Antrim* and HMS *Glamorgan*, were damaged, two of the 'Type 42' class destroyers, HMS *Coventry* and HMS *Sheffield*, were sunk, and a third, HMS *Glasgow*, was damaged. One Argentine destroyer, the 'Allen M. Sumner' class vessel *Hipolito Bouchard*, was thought to have suffered slight underwater damage when it was hit by a Mk 8** torpedo that failed to explode during HMS *Conqueror*'s sinking of the Argentine cruiser *Belgrano*.

Exocet anti-ship missiles caused the sinking of the *Sheffield* – the first ship lost in the conflict – and damage to the *Glamorgan*. This highlighted the Royal Navy's lack of a credible defence against sea-skimming anti-ship missiles in her front-line destroyers and, in conjunction with their demonstrated individual vulnerability to saturation air attacks started the Royal Navy in a radical change of direction, marked by increased urgency in the procurement of new weapons and sensors to rectify some of the deficiencies uncovered. One argument that was raised in the defence of the destroyers' lack of an adequate defensive armament by several Ministry of Defence sources was that such systems were not immediately required for these ships as the UK's main potential protagonist, the USSR, did not have any such sea-skimming missiles in service, but this was to say the least fallacious in the extreme as reliable American sources had already documented the presence of the SS-N-7 J-band active radar homing sea-skimming cruise missile on 'Charlie' class cruise-missile submarines since they entered service in 1967. The Ministry of Defence in the post-Falklands defence reviews then decided that the 'Type 42' class ships would after all be sent for mid-life refits in order to upgrade their weapon and sensor outfits. However, because of the ever-present stability problems in the class it does not now appear possible to fit the Dutch 30-mm Goalkeeper CIWS as planned. Even the four stretched 'Type 42' class units will have to lose their aft Sea Dart Type 909 guidance radar in order to accommodate a Sea Wolf point-defence missile system with its associated radars. Thus the future of the destroyer in the Royal Navy is not at all certain, for politicians will consider the least capable ships in the fleet as expensive luxuries that can be discarded as a result of their periodic defence reviews, designed to cut costs.

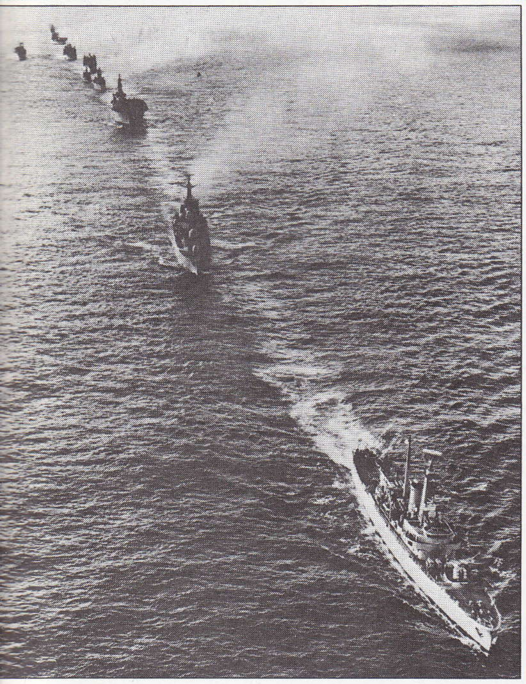
In the meantime the Americans have used some of their 'Spruance' class destroyers off Lebanon in late 1983 and early 1984 to provide fire support for the US Marines and the Lebanese government forces ashore. Other destroyers of the American, British and French navies have been used to monitor the simmering Gulf War between Iran and Iraq on what has become known as the Gulf patrol in case the war begins to threaten the oil trade. It now only remains to be seen what the next 'short' war will bring to the destroyer's list of actions.



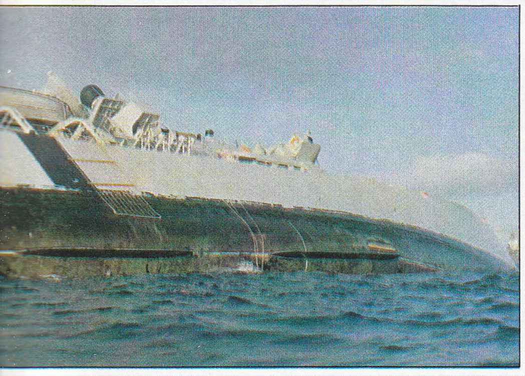
The 'Gearing' class destroyer USS* Richard B. Andersen *(DD786) opens fire with her 127-mm (5-in) guns on a North Vietnamese target whilst operating in the Gulf of Tonkin. These elderly World War II destroyers provided the majority of the naval gunfire support during the early part of the Vietnam War.



Above: The Israeli navy ship Yaffa *(No. 42) with a motor torpedo boat. She was the sister ship to the ill fated* Eilat*, sunk in October 1967 by 'Styx' missiles fired from Egyptian 'Komar' class missile boats operating in Port Said harbour.*

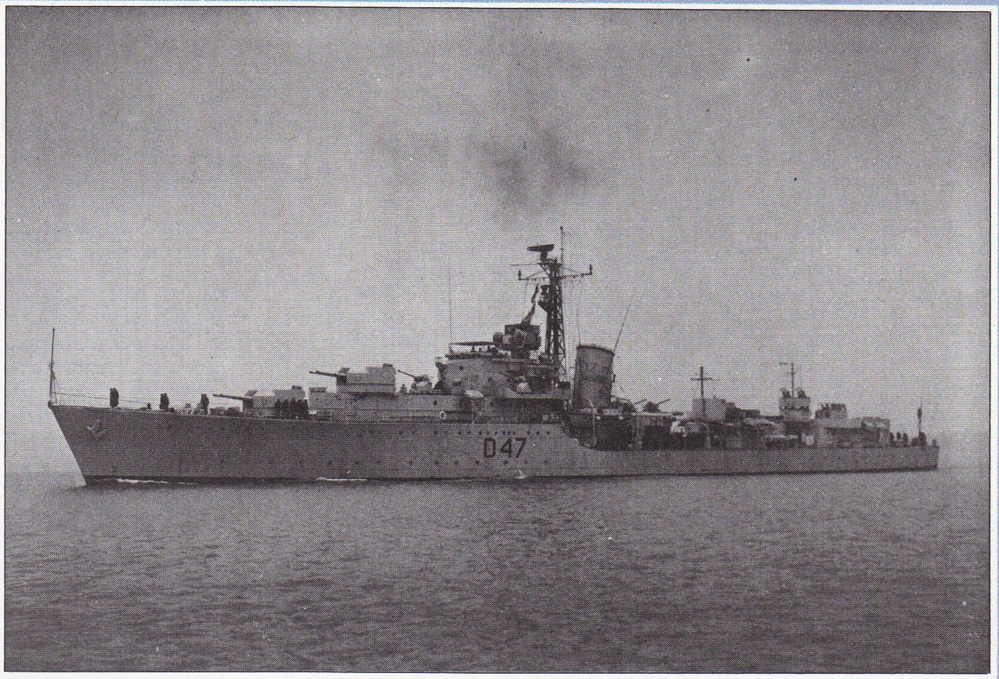


Above: The Sea Wolf-armed 'Leander' class frigate HMS Andromeda *leads the Falklands carrier group with the destroyer HMS* Bristol *(D23) behind.*



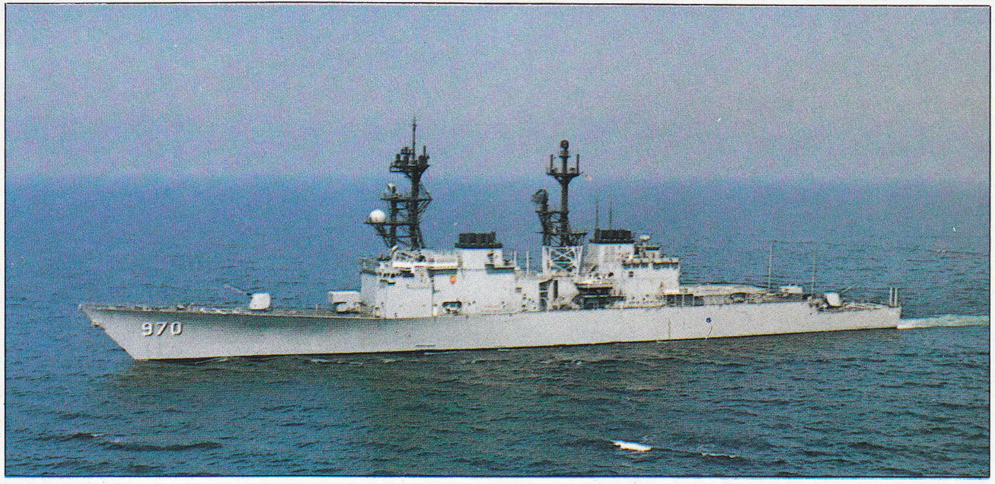
Above: The 'Type 42' destroyer HMS Coventry *(D118) sinks after being hit by three 454-kg (1000-lb) bombs during an Argentine attack on 25 May 1982.*

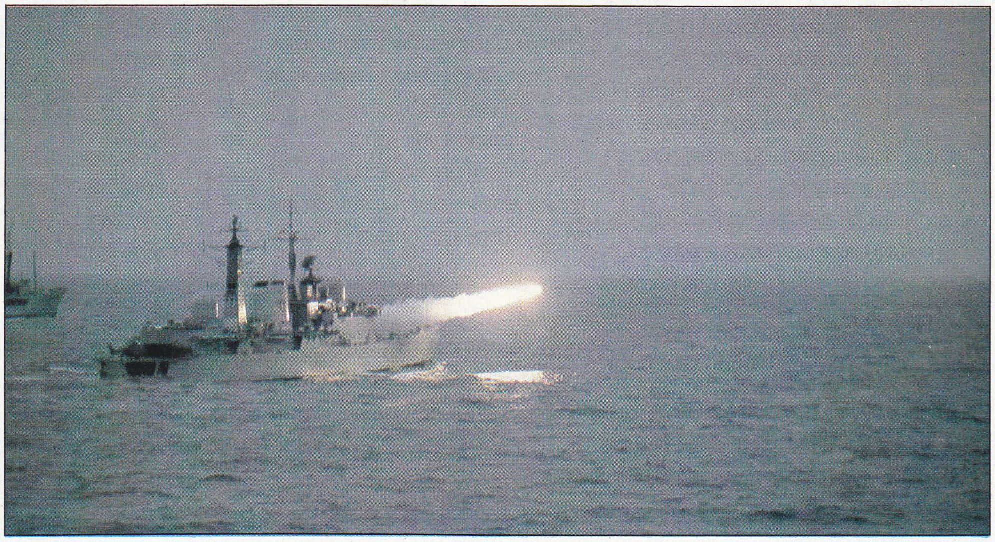
Right: A 'Type 42' destroyer fires a Sea Dart missile off the Falkland Islands. The loss of HMS Sheffield *and HMS* Coventry *pointed out weaknesses in Royal Navy defences against air attack.*



Above: The 'Battle' class destroyers PNS Khaibar *and PNS* Badr *(shown here in her Royal Navy days) were fine ships of their type, but the sinking of the* Khaibar *by Indian 'Styx' missiles launched from an 'Osa' class fast patrol craft meant that the gun- and torpedo-armed destroyer had had its day.*

Below: Ostensibly anti-submarine warfare vessels, 'Spruance' class destroyers of the US Navy were amongst the American task force off Lebanon in 1982/3. Their primary task was to provide gunfire support to the hard-pressed Marine Corps peacekeepers in Beirut.





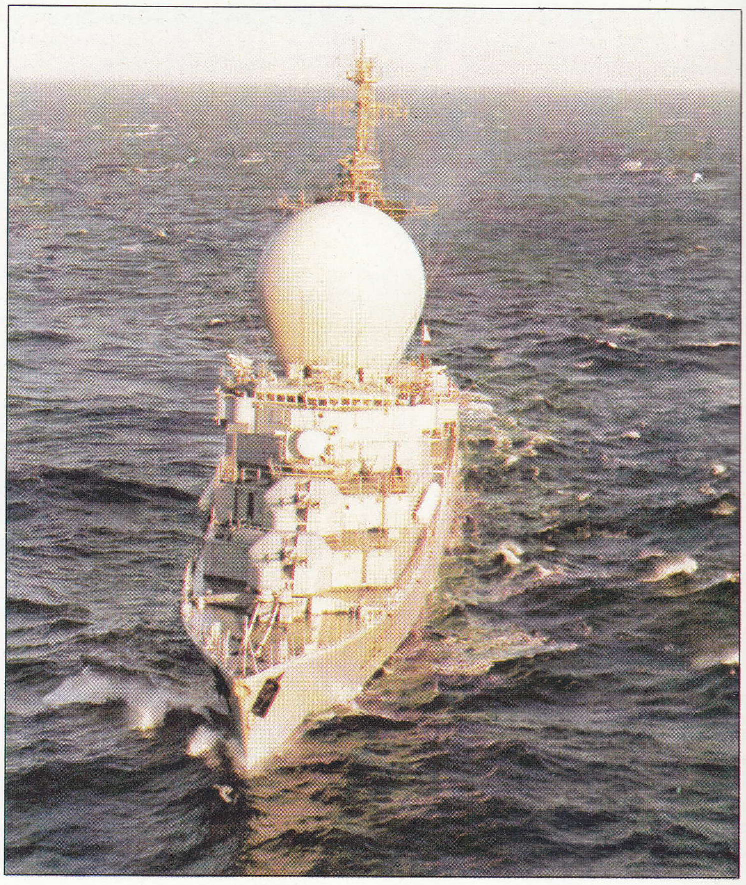
FRANCE

'Suffren' class

Originally classed as light cruisers, the ***Suffren*** (D602) and the ***Duquesne*** (D603) were reclassed as **'Suffren' class** destroyers. In actual fact they are guided-missile destroyers designed to give area anti-air warfare and ASW protection to the 'Clemenceau' class aircraft-carriers. Initial plans called for three ships to be built as a start, with more planned, but in practice only two were laid down. Built almost exclusively with French weapons and sensors, they were the first French naval vessels to be designed to carry SAM missiles, and with three pairs of gyro-controlled non-retractable stabilizers are very stable missile platforms. They are distinguishable in French service by the isolated tall central 'mack' and the distinctive DRBI 23 radome forward, the radome being unique to this class. In the mid-1970s both vessels underwent modifications to fit new weapons and to upgrade the area-defence SAM system to fire only the Masurca Mk 2 Model 3 semi-active radar homing missile. Both ships are now serving with the French Mediterranean Fleet as escorts to the carriers, being transferred there in 1975. The area-defence ASW missile carried is the Malafon, a 1500-kg (3,307-lb) 13-km (8.1-mile) range command-guided glider. This is launched with the aid of a double booster and has as payload a 30-kt 533-mm (21-in) L4 active/passive acoustic-homing ASW torpedo weighing 540 kg (1,190 lb) and having a range of around 5.5 km (3.4 miles). The vessels use the 35-kt 1000-kg (2,205-lb) L5 Model 4 active/passive acoustic-homing torpedo in their self-defence tubes. These have a 150-kg (331-lb) HE warhead compared with the 104-kg (229-lb) warhead of the L4, and a range in the order of 7 km (4.35 miles).

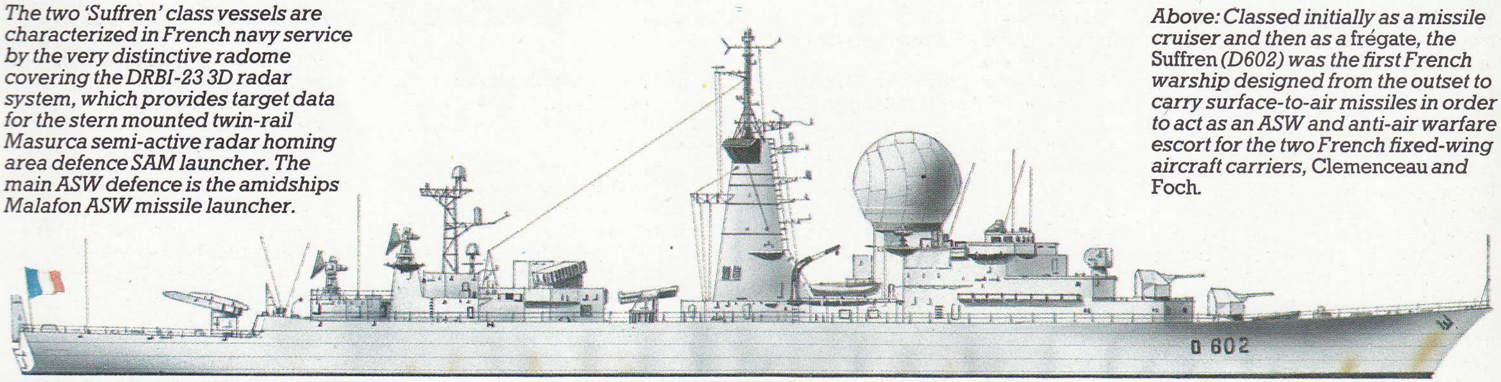
Specification

'Suffren' class
Displacement: 5,090 tons standard and 6,090 tons full load
Dimensions: length 157.6 m (517 ft); beam 15.54 m (51 ft); draught 7.25 m (23 ft 9 in)
Machinery: geared steam turbines delivering 72,500 hp (54065 kW) to two shafts
Speed: 34 kts
Aircraft: none
Armament: four single MM.38 Exocet launchers (no reloads), one twin Masurca SAM launcher (48 missiles), two single 100-mm (3.9-in) DP guns, four single 20-mm AA guns, one single Malafon ASW missile launcher (13 missiles), and four single fixed ASW 533-mm (21-in) torpedo tubes (10 L5 torpedoes)
Electronics: one DRBI 23 air-search and target-designation radar, one DRBV 50 surface-search radar, two DRBR 51 Masurca fire-control radars, one DRBC 32A fire-control radar, one DRBN 32 navigation radar, one URN-20 TACAN, one SENIT 1 action information system, one ESM suite, two Dagaie chaff/decoy launchers, one DUBV 23 hull sonar, and one DUBV 43 variable-depth sonar
Complement: 355



Above: Classed initially as a missile cruiser and then as a frégate, the Suffren *(D602) was the first French warship designed from the outset to carry surface-to-air missiles in order to act as an ASW and anti-air warfare escort for the two French fixed-wing aircraft carriers,* Clemenceau *and* Foch.

The two 'Suffren' class vessels are characterized in French navy service by the very distinctive radome covering the DRBI-23 3D radar system, which provides target data for the stern mounted twin-rail Masurca semi-active radar homing area defence SAM launcher. The main ASW defence is the amidships Malafon ASW missile launcher.



FRANCE

'Type C70' class

The **'Type C70' class** is designed to replace both the 'Type T47' and 'Type T53' class destroyers built in the 1950s, and as such is divided into two groups, one specifically for the ASW task and the other for anti-air warfare duties.

The eight **'Type C70/ASW'** vessels, the ***George Leygues*** (D640), ***Dupleix*** (D641), ***Montcalm*** (D642), ***Jean de Vienne*** (D643) plus four others as yet unnamed, incorporate many of the features employed in the three 'Type F677' frigates but on a smaller displacement. The first four **'Type C70/1'** ships have the same hangar and facilities for the two embarked Westland Lynx helicopters, one of which is equipped for the localization, classification and attack of sub-surface targets with dipping sonar, Mk 44 and Mk 46 torpedoes, and 161-kg (350-lb) depth bombs, whilst the other is configured for the detection, identification and attack of small lightly-defended surface targets with AS.12 wire-guided and AS.15TT command-guided missiles. The last four ships form a separate sub-class (**'Type C70/2'**) and will incorporate several modifications to the basic design, including a longer-range anti-missile capable Crotale SAM system, a towed-array sonar and a raised bridge structure. No Malafon ASW missile system could be carried by either sub-class because of the space required for the gas-turbine propulsion system and its exhaust outlets.

The same hull is used for the **'Type C70/AA'** anti-air warfare version, but the armament and propulsion fits are completely different. Only the first two ships have been ordered as yet for completion in 1987-8, the final two units being scheduled for commissioning in 1990. The Mk 13 Standard missile launchers used will be refurbished units taken from 'Type T47' destroyers as they pay off for replacement by the 'Type C70s'. The single Aérospatiale SA 365F Dauphin helicopter carried by each ship will be used primarily in the anti-surface ship role with AS.15TT missiles, and will also be capable of providing mid-course guidance for over-the-horizon targeting of the MM.40 Exocets.

Specification

'Type C70/ASW' class
Displacement: 3,830 tons standard and 4,170 tons full load
Dimensions: length 139.0 m (456 ft); beam 14.0 m (45 ft 11 in); draught 5.7 m (18 ft 8 in)
Machinery: CODOG arrangement with two Rolls-Royce Olympus gas turbines delivering 52,000 shp (38775 kW) and two SEMT-Pielstick 16PA6 CV280 diesels delivering 10,400 shp (7755 kW) each to two shafts
Speed: 30 kts
Aircraft: two Westland Lynx anti-submarine and anti-ship helicopters
Armament: up to eight single MM.38 Exocet (MM.40 Exocet from *Montcalm* onwards) anti-ship missile launchers (no reloads), one octuple Crotale Naval SAM launcher (26 missiles), one single 100-mm (3.9-in) DP gun, two single 20-mm AA guns, and two single fixed 533-mm (21-in) ASW torpedo tubes (10 L5 torpedoes)
Electronics: one DRBV 26 air-search radar, one DRBV 51C air- and surface-search radar, one DRBC 32D fire-control radar, two Decca 1226 navigation radars, one SPG-51C missile fire-control radar, one SENIT 4 action information system, one ARBR 17 passive ESM system, two Sagaie and two Dagaie chaff/decoy launchers, one DUBV 23 hull sonar, one DUBV 43 variable-depth sonar and (last four only) one EBTF passive towed-array

sonar
Complement: 216

Specification
'Type C70/AA' class
Displacement: 4,000 tons standard and 4,340 tons full load
Dimensions: length 139.0 m (456 ft); beam 14.0 m (45 ft 11 in); draught 5.5 m (18 ft)
Machinery: four SEMT-Pielstick 18PAG BTC diesels delivering 42,300 shp (31545 kW) to two shafts
Speed: 29.6 kts
Aircraft: one Aérospatiale SA 365F Dauphin anti-ship helicopter
Armament: four twin MM.40 Exocet anti-ship missile launchers (no reloads), one Mk 13 single-rail Standard SM-1MR SAM launcher (40 missiles), two single 100-mm (3.9-in) DP guns, two single 20-mm AA guns, and two single fixed 533-mm (21-in) ASW torpedo tubes (10 L5 torpedoes)
Electronics: one DRBJ 11B 3D radar, one DRBV 26 air-search radar, two SPG-51C SAM missile-control radars, one DRBC 32D fire-control radar, one SENIT 6 action information system, one ARBR 17 and one ARBB 33 ESM systems, two Dagaie and two Sagaie chaff/decoy launchers, one DUBA 25 hull sonar, and one EBTF passive towed-array sonar
Complement: 241

Designed to replace the 'Type T47' and 'Type T53' classes of destroyers, the 'Type C70' is to be built in two sub-classes for ASW and anti-air warfare purposes. The lead ship of the ASW group is the **Georges Leygues** ***(D640), and she will be joined by seven sister ships.***

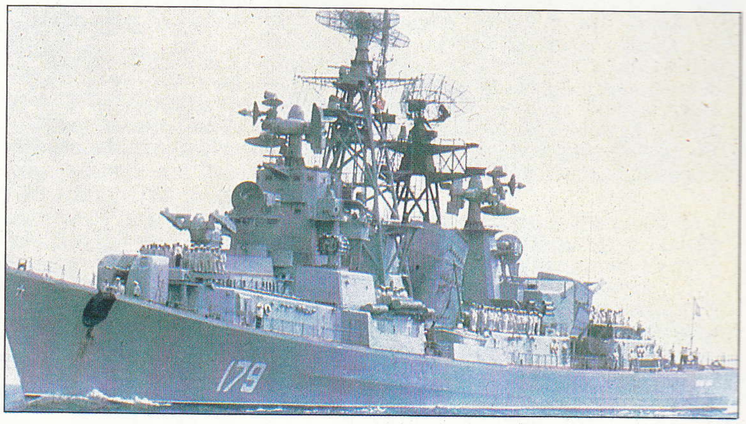
USSR

'Kashin' and 'Kashin (Mod)' classes

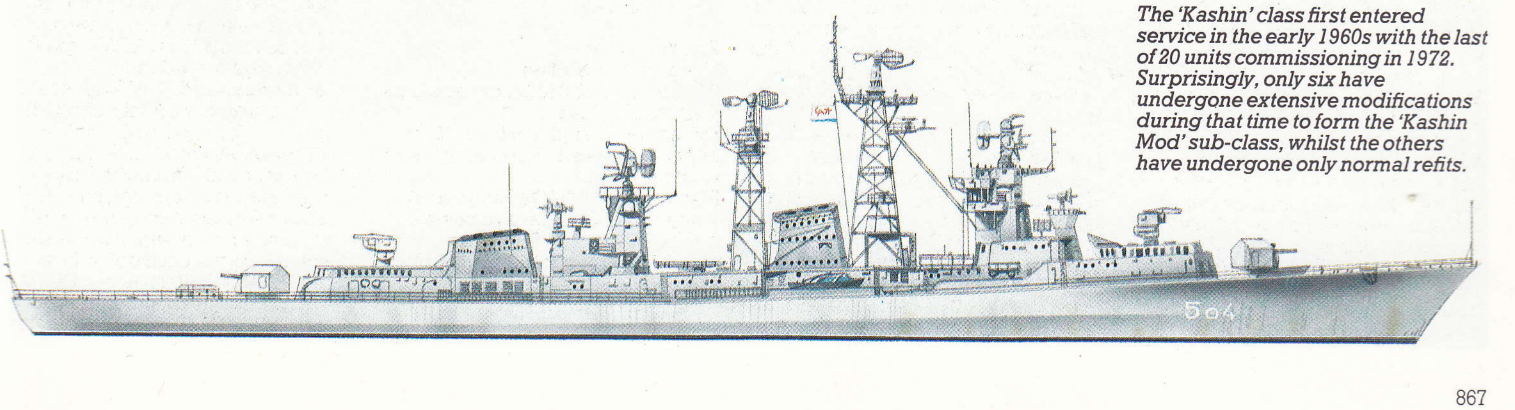
Built as the world's first major class of warships powered by gas turbines, the 20-ship **'Kashin' class** was produced from 1963 onwards at the Zhdanov Shipyard, Leningrad (four units 1964-6), and at the 61 Kommuna (North) Shipyard, Hikolayev (16 units 1963-72). The last ship, ***Sderzhanny***, was completed to a revised design subsequently designated **'Kashin (Mod)' class** by NATO. This involved lengthening the hull, modernizing the electronics and fitting four SS-N-2c 'Styx' SSM launchers, ADG6-30 CIWS mountings and a variable-depth sonar. Since the *Sderzhanny* was completed five other ships (the ***Ognevoy, Slavny, Smely, Smyshlenny*** and ***Stroyny***) have undergone conversion to this configuration between 1973 and 1980. In 1974 the ***Otvzhny*** of the standard type foundered in the Black Sea following a catastrophic explosion and fire that lasted for five hours. Over 200 of her crew were killed, making this the worst peacetime naval disaster since World War II. In 1981 the ***Provorny*** re-entered service with the Black Sea Fleet following conversion to the trials ship for the SA-N-7 SAM system. Apart from the previously mentioned units the other units of this *bolshoy protivolodochny korabl'* (large ASW ship) type are the ***Komsomolets Ukrainy, Krasny-Kavkaz, Krasny-Krim, Obraztsovy, Odarenny, Reshitelny, Skory, Smetlivy, Soobratzitelny, Sposobny, Steregushchy*** and ***Strogy***. Most are expected to serve on into the 1990s, although a new missile-armed destroyer class is expected to enter service soon as their eventual replacements. Three further units, designated **'Kashin II'** by NATO, were built at Nikolayev in the late 1970s for India; named ***Rajput*** (D51), ***Rana*** (D52) and ***Ranjit*** (D53) these are considerably modified in comparison with the Soviet ships, having only a single 76-mm (3-in) gun mount, four SS-N-2b 'Styx' SSM launchers in pairs on each side of the bridge, and a helicopter flight deck and hangar aft for one Kamov Ka-25 'Hormone-A' ASW helicopter in place of the after 76-mm (3-in) gun mount. A further three ships were believed to have been ordered by India in 1982.

Specification
'Kashin' class
Displacement: 3,750 tons standard and 4,500 tons full load
Dimensions: length 144.0 m (472 ft 5 in); beam 15.8 m (51 ft 10 in); draught 4.8 m (15 ft 9 in)
Machinery: four gas turbines delivering 96,000 shp (71585 kW) to two shafts
Speed: 36 kts
Aircraft: helicopter landing pad only
Armament: two twin SA-N-1 'Goa' SAM launchers (32 missiles) except *Provorny* one twin SA-N-7 single-rail SAM launcher (24 missiles), two twin 76-mm (3-in) DP guns, two 250-mm (9.84-in) RBU600 ASW rocket launchers, one quintuple 533-mm (21-in) ASW torpedo tube mounting (except *Provorny* none), and 20-40 mines (according to type)
Electronics: (*Provorny*) one 'Head Net-C' 3D radar, one 'Top Steer' 3D radar, two 'Don Kay' navigation radárs, eight 'Front Dome' SA-N-7 fire-control radars, two 'Watch Dog' ECM systems, one 'High Pole-B' IFF system, two 'Owl Screech' 76-mm (3-in) fire-control radars, and one high-frequency hull sonar
Electronics: (rest) eight ships one 'Big Net' air-search and one 'Head Net-C' 3D radars, or three ships two 'Head Net-A' air-search radars, or *Soobrazitelny* two 'Head Net-C' 3D radars, two 'Peel Group' SA-N-1 fire-control radar, two 'Don Kay' or 'Don 2' navigation radars, two 'Owl Screech' 76-mm (3-in) fire-control radars, two 'Watch Dog' ECM systems, two 'High Pole-B' IFF systems, and one high-frequency hull sonar
Complement: 280

Specification
'Kashin (Mod)' class
Displacement: 3,950 tons standard and 4,650 tons full load
Dimensions: length 147.0 m (482 ft 3 in); beam 15.8 m (51 ft 10 in); draught 4.8 m (15 ft 9 in)
Machinery: as 'Kashin' class
Speed: 35 kts
Aircraft: helicopter landing pad only
Armament: four single SS-N-2c 'Styx' SSM launchers (no reloads), two twin SA-N-1 'Goa' SAM launchers (32 missiles), four 30-mm ADG6-30 CIWS mountings, two 250-mm (9.84-in) RBU6000 ASW rocket launchers, and one quintuple 533-mm (21-in) ASW torpedo tube mounting
Electronics: one 'Big Net' aft-search radar, one 'Head Net-C' 3D radar, (except *Ognevoy* two 'Head Net-A' air-search radars), two 'Don Kay' navigation radars, two 'Owl Screech' 76-mm (3-in) fire-control radars, two 'Bass Tilt' CIWS fire-control radars, two 'Peel Group' SA-N-1 fire-control radars, two 'Bell Shroud' and two 'Bell Squat' ECM systems, four 16-barrel chaff and IR decoy launchers, one medium-frequency hull sonar, and one low-frequency variable-depth sonar
Complement: 300



Although construction of the 'Kashin' class has long since halted for the Soviet navy, the class in a heavily modified form has been reintroduced specifically for export to India.



The 'Kashin' class first entered service in the early 1960s with the last of 20 units commissioning in 1972. Surprisingly, only six have undergone extensive modifications during that time to form the 'Kashin Mod' sub-class, whilst the others have undergone only normal refits.

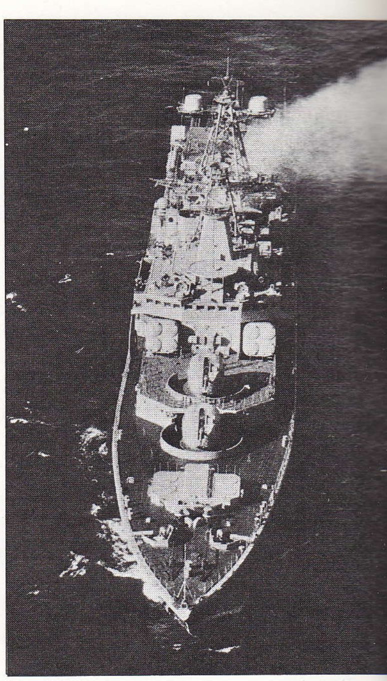
USSR

'Udaloy' class

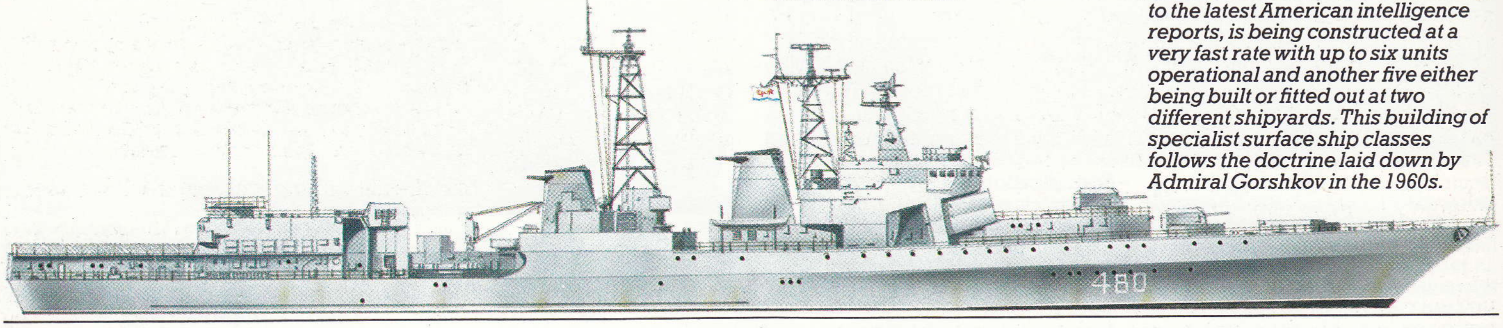
The **'Udaloy' class** (Soviet designation *bolshoy protivolodochny korabl'*, or large ASW ship) was originally given the provisional NATO codename **BalCom 3.** The two ships operational in early 1984, the ***Udaloy*** and ***Vitse Admiral Kulakov***, are similar in concept to the American 'Spruance' class ASW destroyers, even to the use of gas turbine propulsion. The class is under construction at the Yantar Shipyard (Kaliningrad) and the Zhdanvo Shipyard (Leningrad), and it is estimated that around a dozen will be in service by the end of the decade. The class has four funnels in an arrangement similar to that of the 'Kashin' class missile destroyers, and carries two quadruple launchers for the SS-N-14 'Silex' missile as the main armament. A unique twin hangar system with associated helicopter flight deck is located aft for two Kamov Ka-27 'Helix-A' ASW helicopters. These carry dipping sonar, sonobuoys, a surface-search radar, nuclear or conventional depth charges, and 450-mm (17.7-in) ASW torpedoes for their anti-submarine role, and can be used in all-weather and night dipping sonar operations. It is probable that the 'Helix-A' also carries a targeting and mid-course guidance unit for the 'Silex' missiles, so making it possible for the missile's 55-km (34.1-mile) maximum range to be exploited fully. If this is correct, the capability of the 'Udaloys' is considerably enhanced over that of other Soviet ASW ships, it being thought previously that only suitably equipped surface ships could guide the 'Silex'. The self-defence SAM carried is the vertical-launch SA-N-8 system, with an as-yet unidentified missile in eight six-round launch bins.

Specification

'Udaloy' class
Displacement: 6,700 tons standard and 8,200 tons full load
Dimensions: length 162.0 m (531 ft 6 in); beam 19.3 m (63 ft 4 in); draught 6.2 m (20 ft 4 in)
Machinery: four gas turbines in a COGOG arrangement delivering 120,000 shp (89485 kW) to two shafts
Speed: 34 kts
Aircraft: two Kamov Ka-27 'Helix-A' ASW helicopters
Armament: two quadruple SS-N-14 'Silex' ASW missile launchers (no reloads), eight SA-N-8 SAM launchers (48 missiles), two single 100-mm (3.9-in) DP guns, four 30-mm ADG6-30 CIWS mountings, two 250-mm (9.84-in) RBU6000 ASW rocket launchers, two quadruple 533-mm (21-in) ASW torpedo tubes, and 30-50 mines (depending on type)
Electronics: two 'Strut Pair' air- and surface-search radars, three 'Palm Frond' navigation and helicopter-control radars, two unoccupied positions or missile fire-control radars, two 'Eye Bowl' SS-N-14 fire-control radars, one 'Kite Screech' 100-mm (3.9-in) fire-control radars, two 'Bass Tilt' CIWS fire-control radars, two 'Round House' TACAN, two 'High Pole-B' IFF, one 'Fly Screen-B' aircraft landing aid, two 'Bell Shroud' and two 'Bell Squat' ECM systems, two twin-barrel chaff and IR decoy launchers, one low-frequency bow sonar, and one low-frequency variable-depth sonar
Complement: 300



Right: Fitted with eight launchers for a new vertical launch point defence SAM system plus the usual variety of Soviet ASW weapon systems, the 'Udaloy' class of ASW destroyer is well capable of taking care of itself in unfriendly waters whilst prosecuting a submarine contact.



Below: The 'Udaloy' class, according to the latest American intelligence reports, is being constructed at a very fast rate with up to six units operational and another five either being built or fitted out at two different shipyards. This building of specialist surface ship classes follows the doctrine laid down by Admiral Gorshkov in the 1960s.

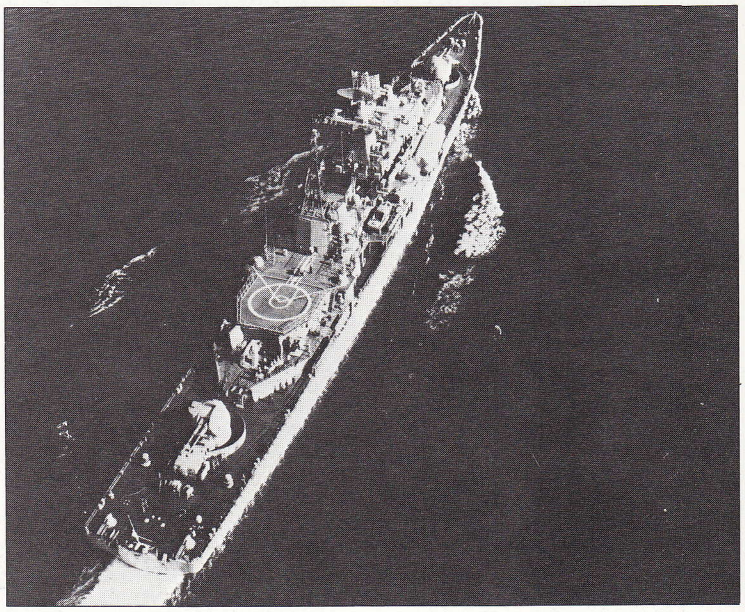
USSR

'Sovremenny' class

Known originally as **BalCom 2** (Baltic Combatant no. 2) by NATO, the **'Sovremenny' class** took over the construction slipway at the Zhdanov Shipyard, Leningrad, that had been used by the 'Kresta II' ASW cruiser class. Two units, the ***Sovremenny*** and ***Otchyanny***, are currently in service with additional units joining at yearly intervals from 1983 onwards. Designated by the Soviets as *eskadrenny minonosets* (destroyer), the class is devoted to surface strike warfare with a self-defence SAM system and a limited ASW capability. The propulsion plant is of the pressurized geared steam turbine type, and the design is the first Soviet warship type to be fitted with a telescoping helicopter hangar amidships next to the helicopter landing platform. The main armament comprises two quadruple SSM launchers for the new SS-N-22 (an improved and higher-speed version of the SS-N-9 'Siren') fitted with either a 500-kg (1,102-lb) HE or 200-kiloton nuclear warhead. Two twin 130-mm (5.12-in) fully automatic water-cooled gun mounts are also fitted fore and aft: controlled by a 'Kite Screech' H-band fire-control radar, these can engage surface targets out to 28000-m (30,600-yard) range. The SAM system fitted is the SA-N-7, which uses two single-rail launchers and six 'Front Dome' radar directors. The Mach 3 SA-N-7 is a navalized version of the Soviet army's solid-fuel SA-11 missile and will eventually replace the SA-N-1 'Goa' as the navy's medium-range SAM system. Target engagement altitudes are between 300 m (100 ft) and 14000 m (45,930 ft), with a minimum range of 3 km (1.86 miles) and a maximum range of 28 km (17.4 miles). It is estimated that by the late 1980s 10 'Sovremenny' class will be in service.

Specification

'Sovremenny' class
Displacement: 6,200 tons standard and 7,800 tons full load
Dimensions: length 155.6 m (510 ft 6 in); beam 17.3 m (56 ft 9 in); draught 6.5 m (21 ft 4 in)
Machinery: geared turbo-pressurized steam turbines delivering 100,000 shp (74570 kW) to two shafts
Speed: 36 kts
Aircraft: one Kamov Ka-25 'Hormone-B' missile-guidance/Elint helicopter
Armament: two quadruple SS-N-22 SSM launchers (no reloads), two single SA-N-7 SAM launchers (48 missiles), two twin 130-mm (5.12-in) DP guns, four 30-mm ADG6-30 CIWS mountings, two RBU1000 300-mm (11.8-in) ASW rocket launchers, two twin 533-mm (21-in) ASW torpedo tubes, and 30-50 mines (according to type)
Electronics: one 'Top Steer' 3D radar, three 'Palm Frond' navigation and helicopter-control radars, one 'Band Stand' SS-N-22 fire-control radar, two 'Bass Tilt' CIWS fire-control radars, one 'Kite Screech' 130-mm (5.12-in) fire-control radar, six 'Front Dome' SA-N-7 fire-control radars, two 'Bell Shroud' and two 'Bell Squat' ECM systems, two twin-barrel chaff/IR decoy launchers, and one medium-frequency hull sonar
Complement: 350



The 'Sovremenny' class introduced a new fully-automatic water-cooled 130-mm (5.12-in) dual-purpose gun into service, as well as a telescopic helicopter hangar forward of the landing pad.

The Modern Soviet Destroyer

Nowhere has the rise of Soviet power been more evident than in the expansion of the Soviet navy. What was basically a coastal force in 1945 is now a potent blue-water fleet, and the destroyer forces have undergone a similar transformation. The extremely capable new generation of Soviet fighting ships looks to pose a severe problem to NATO planners.

In the West there is a wide range of warships meaninglessly humped together as 'destroyers'. The Soviet fleet, too, operates a similarly wide band of ships and, though Western references tend to apply the same blanket terminology to them, the Soviets group them differently in a scheme broadly based on function.

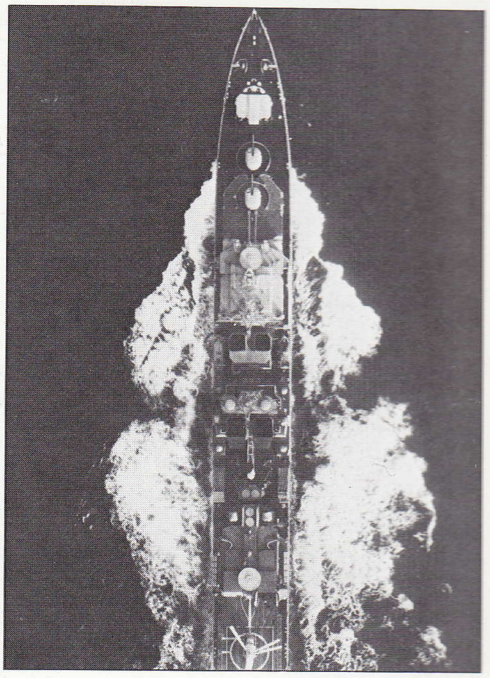
Until recently the Soviet term 'destroyer' meant a flotilla-type vessel of classical layout (older ships of low capability in modern terms) such as the 'Skory' and 'Kotlin' classes, built to the ideas of World War II and only superficially modernized. Beginning in 1981, however, the new 'Sovremenny' class destroyers began to commission, ships with over twice the displacement and a heavy bias toward anti-surface ship operations. Taken in conjunction with the functions of the older vessels, this would seem to point to the Soviet idea of a destroyer as being essentially a ship for fighting other ships.

There are, of course, anomalies. For instance, the 'SAM Kotlin' conversions have changed their function but not, apparently, their categorization. Conversely the 'Kildins', which once carried the monstrous SS-N-1 'Scrubber' SSM on their 'Kotlin' type hulls, have mostly been rearmed with the smaller SS-N-2c 'Styx'. They still, however, bear their earlier Soviet label of 'large missile ship' rather than reverting to 'destroyer' as might have been expected.

The third category of Soviet 'destroyer' is the 'large anti-submarine ship', thought it should be understood that this bracket extends upward to embrace also the 'Kara' and 'Kresta II' classes, known as 'cruisers' in the West. Anomalies exist here also, the oldest of the type, the 'Kanins', having minimal ASW capacity. Perversely, the 19-strong 'Kashin' class has a strong AAW bias. Both these and the older 'Kanins' have only rocket-launchers and torpedo tubes for AS work, neither type boasting variable-depth sonar or organic helicopter. Their classification may, therefore, represent their dedication to an ASW group rather than refer to any individual potential.

Only in 1981, in fact, did a destroyer-sized 'large AS ship' class with any real potential in this direction enter service. This was the 'Udaloy' which together with the 'Sovremenny' and 'Kashin' classes represents the state of the art in ASW, ASUW and AAW as applied to Soviet destroyer-sized ships.

Only comparatively recently has the Soviet fleet reached the point where it is beginning to initiate problems for the West, rather than to respond to Western developments. This new threshold was marked by the entry into service of the so-called 'battle-cruiser' *Kirov* in 1980. An immensely powerful ship, the *Kirov* will play a role analogous to the American 'Iowa' class battleships in forming the core of a Surface Action Group (SAG). Soviet doctrine emphasizes the importance of surface ship support for submarine operations. Geography demands that their submarines need to transit certain choke points which will, inevitably, be hotly contested with the West. There will be an obvious role for a surface group which can not only frustrate Western formations in their efforts but also survive in a very high threat environment while, if possible, extending further Soviet ASW on the spot. It was, therefore, to be expected that the Soviets would produce ships complementary to the *Kirov*, and these have materialized in the cruiser *Slava* in 1983 and the destroyer *Sovremenny* in 1981.



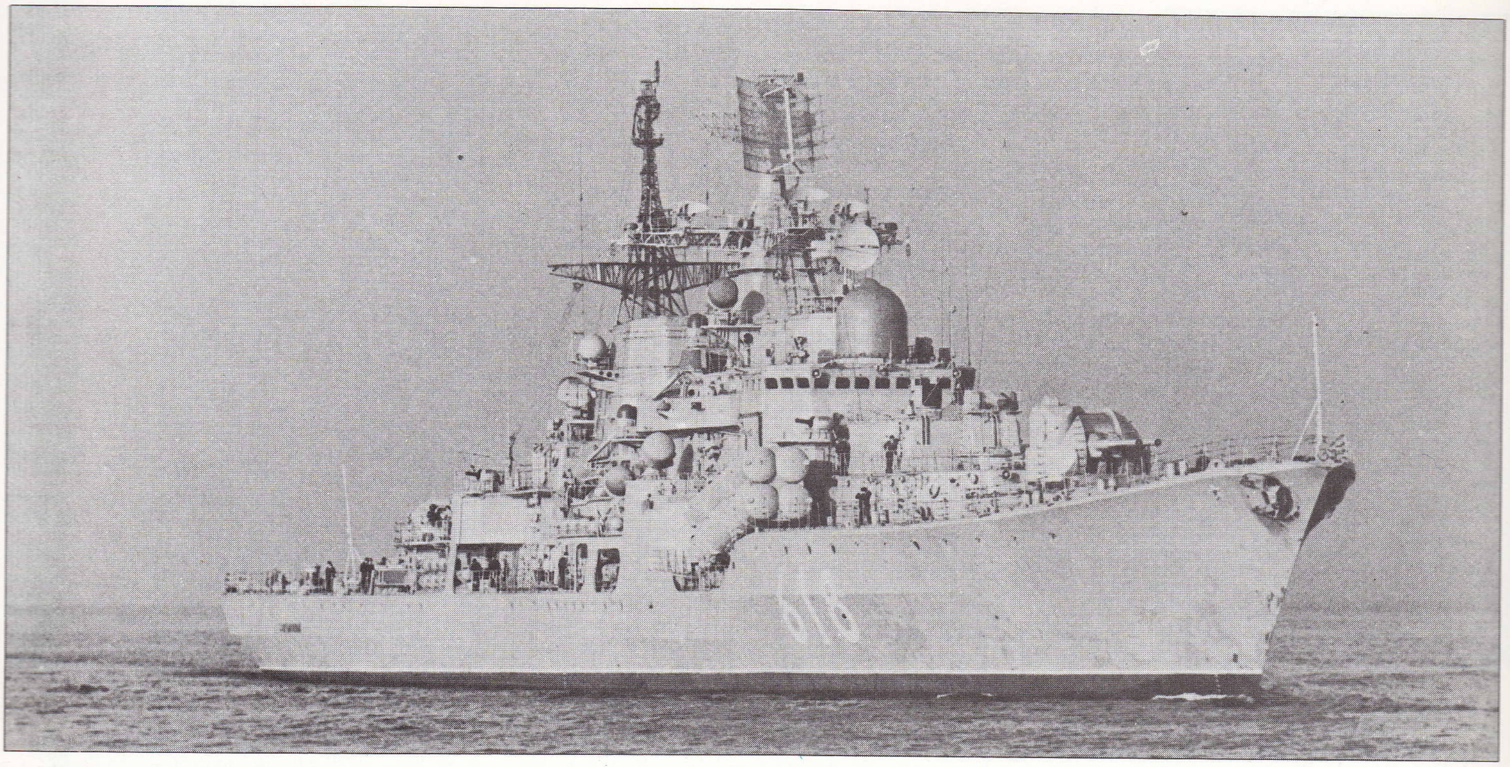
An aerial view of the BPK Udaloy. *Her main armament is two quadruple launchers for the SS-N-14 'Silex' ASW missile and two Kamov Ka-27 'Helix' ASW helicopters, backed up by an extensive array of electronics and an anti-aircraft defence of 100-mm (3.9-in) guns, ADG6-30 Gatling guns and vertical-launch SA-N-8 SAMs.*

Surface warfare

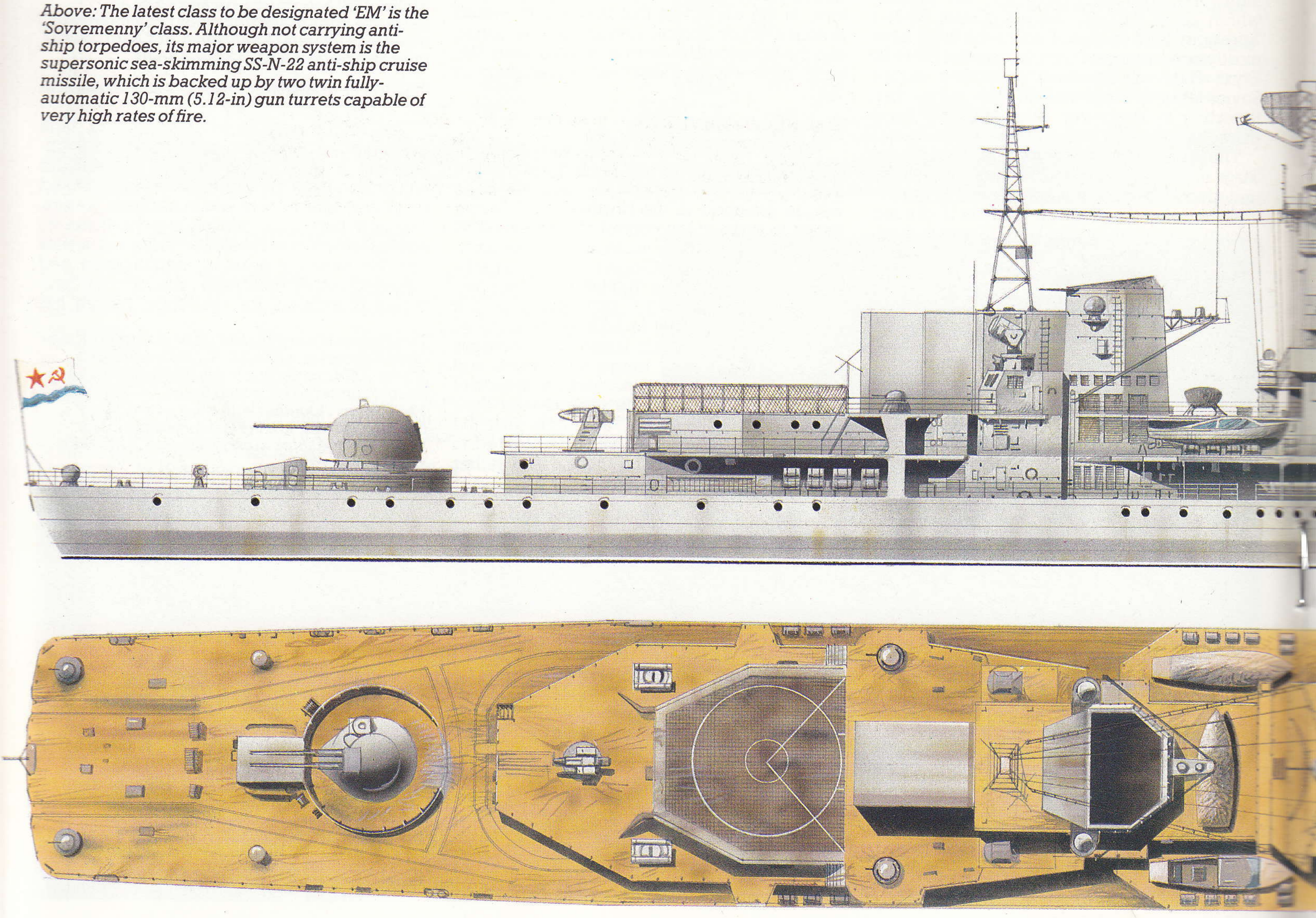
The *Sovremenny* is the first Soviet destroyer designed with an ASUW bias since the immediate post-war period. She and her class will be assigned to the Northern and Pacific Fleets to assist in the control of the vital GIUK and Okhotsk Sea gaps; in the former case particularly, the weather will prove as tough a problem as opposing fleets. Unlike the more comfortable postings to the Mediterranean 5th Eskadra, there will not be time for the lengthy, morale-sapping periods spent at anchorages far offshore. A new range of sensors and weapons has been installed, and a high level of training and skills will be required for their effective use. It is likely, therefore, that the 'Sovremenny' class ships will have drafted to them a high proportion of career men rather than the ill-educated conscripts who abound in the Soviet fleet.

The *Sovremenny* is a robust-looking, high freeboard ship, configured to operation in unpleasant weather. ASW gear is minimal. No VDS is fitted and the hull-mounted sonar would be of only intermittent use in northern waters. The only helicopter carried is a 'Hormone-B', equipped with a surveillance radar and a data link for over-the-horizon identification and targeting rather than ASW. As only one helicopter is shipped, the telescopic hangar has

Two conventional gun- and torpedo-armed 'Kotlin' class destroyers with a SA-N-1 Goa-equipped 'Kotlin' SAM conversion in the Mediterranean are about to undergo refuelling from a Soviet tanker. The 'Kotlins', together with a few active 'Skory' class destroyers, are the last remaining major Soviet surface ships to carry 533-mm (21-in) anti-ship torpedoes.



Above: The latest class to be designated 'EM' is the 'Sovremenny' class. Although not carrying anti-ship torpedoes, its major weapon system is the supersonic sea-skimming SS-N-22 anti-ship cruise missile, which is backed up by two twin fully-automatic 130-mm (5.12-in) gun turrets capable of very high rates of fire.



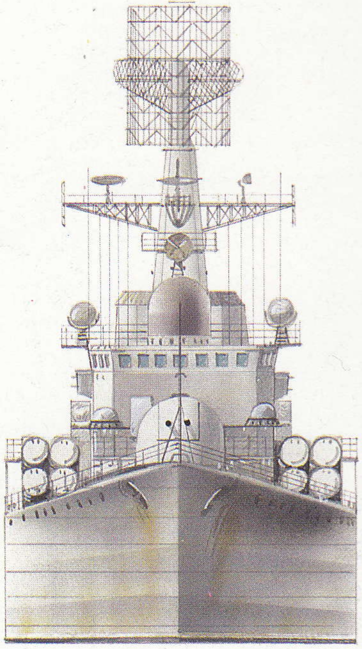
been sited well forward, this in turn allowing the flight pad also to be moved forward, considerably reducing ship's acceleration effects and permitting a widening of its operational envelope.

Although the side quadruple canister/launchers look superficially like those of earlier ASW ships, they contain the new 95-km (60-mile) SS-N-22 for use against surface targets. This range is no better than Western SSMs of far smaller size, though the Soviets may well have the option of a nuclear warhead. A 24-km (15-mile) ranged SA-N-7 SAM launcher is sited at each end, with six separate directors going a long way to counter the problems of saturation attack. To tackle 'leakers' a 30-mm Gatling-type gun is sited at each corner. The medium-calibre gun is back in favour, two twin 139-mm (5.19-in) mountings being fitted. They have water-cooled barrels, pointing to a high rate of fire. Clearly the ships are intended to hold their ground.

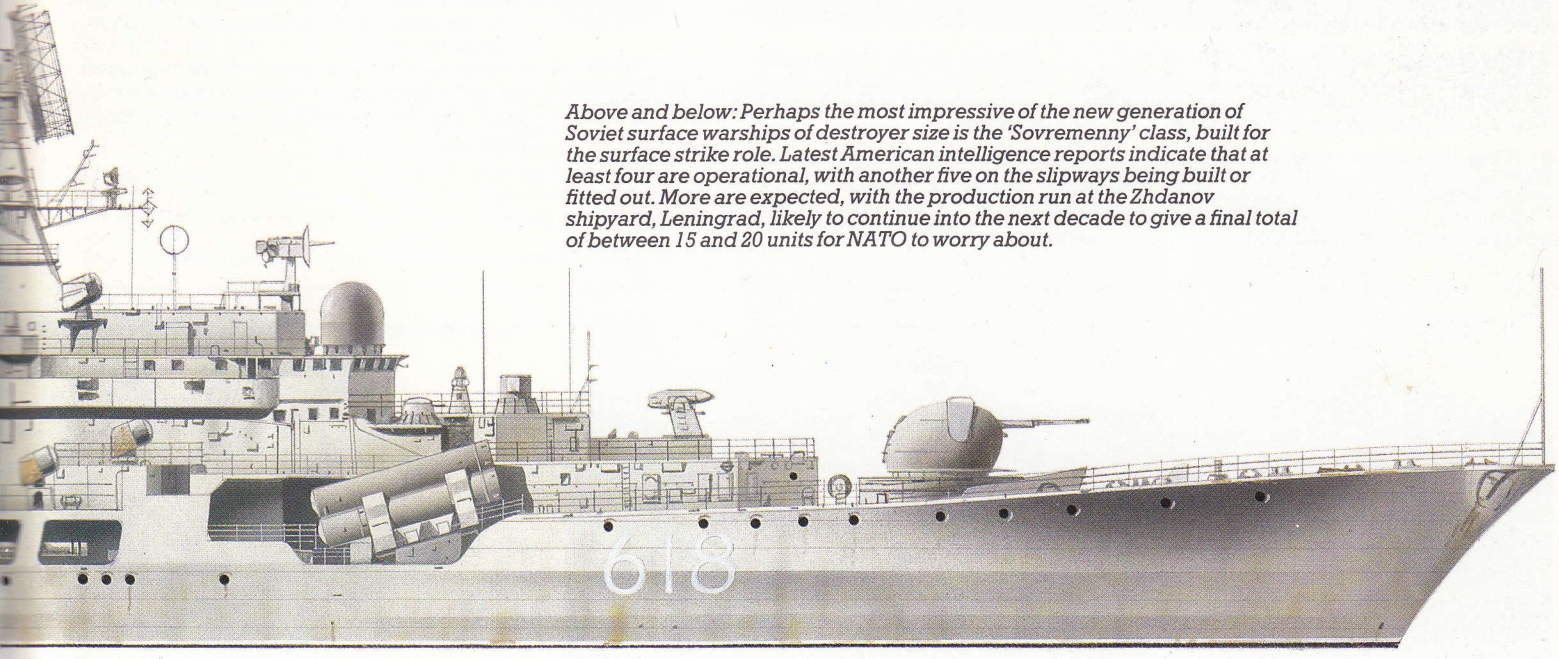
Anti-submarine warfare

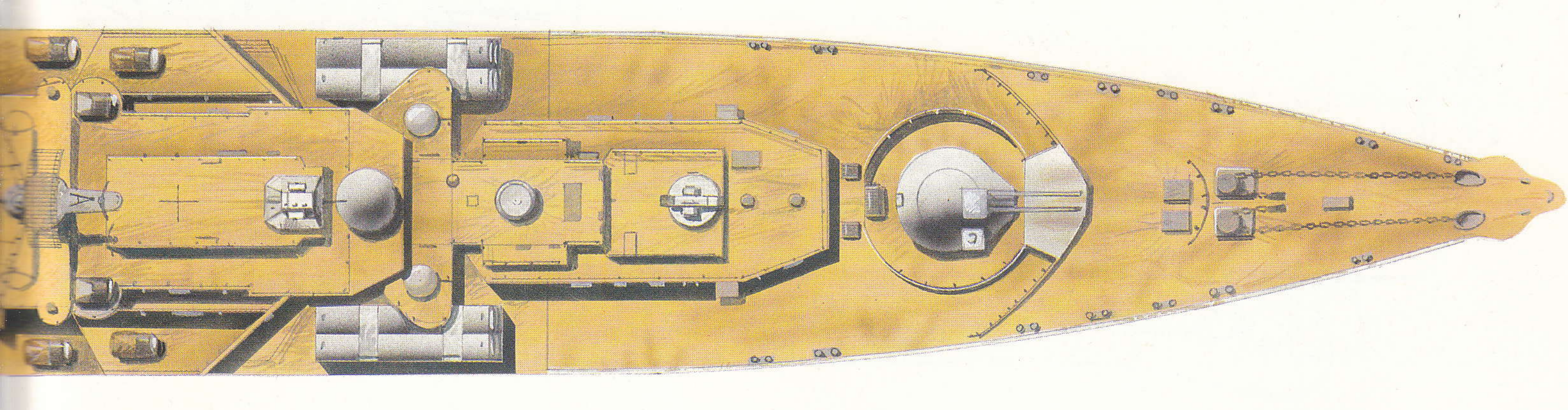
The ASW destroyer *Udaloy* and her class make an interesting contrast. Of a size with both 'Sovremenny' and an American 'Spruance' class, its concepts are widely different. *Udaloy* also has the solid look of a ship designed for use in hostile climatic environments and her role is important, not only in the prevention of Western SSNs' efforts to interdict Soviet submarines but possibly also in the prosecution of Western SSBNs themselves. Two of the new 'Helix' AS helicopters are carried, their bulk demanding an all-aft location for flightpad and hangar. The pad itself gains useful freeboard from being sited above the stowage for the towed variable depth sonar. Compared with that of the *Sovremenny*, the *Udaloy*'s more steeply raked bow betrays a larger, lower-frequency sonar.

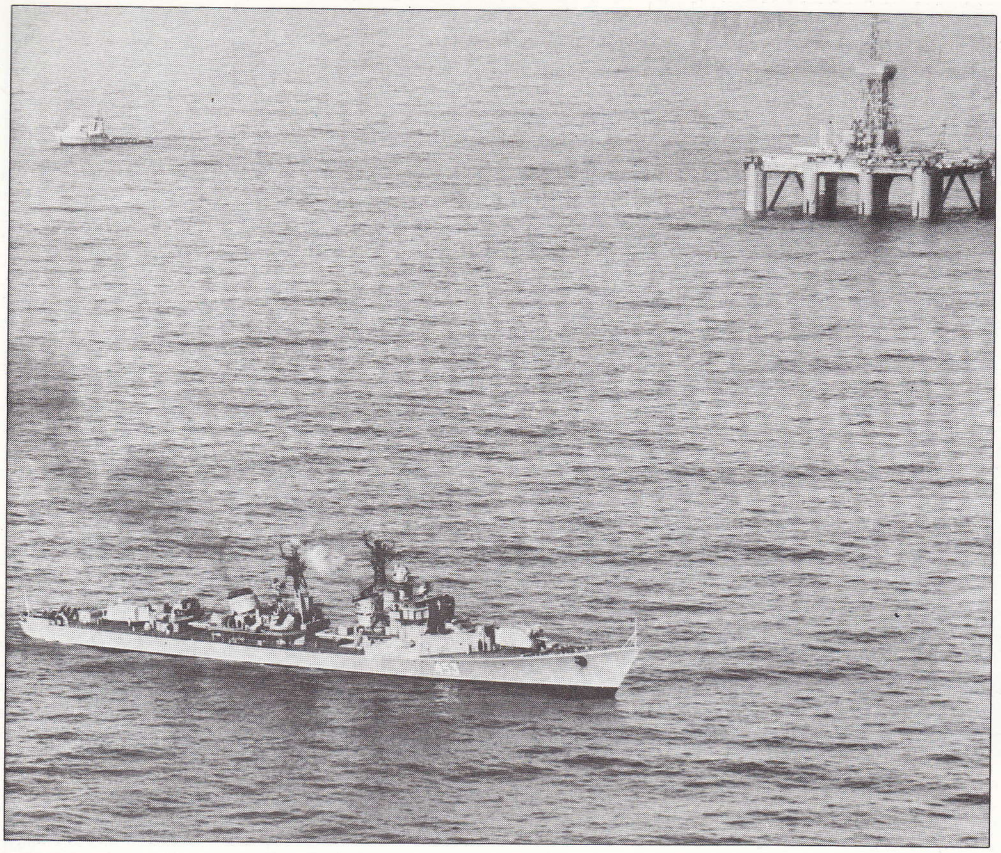
In severe northern conditions, hull-mounted sonars and helicopters are, for half the time, either inoperable or degraded in performance, and it is noticeable that the Soviets have concentrated on producing alternative means of locating and attacking submerged targets. They have been fitting VDS and towed passive arrays for a considerable period and have accumulated much experience in their use. By virtue of temperature and density effects, sound energy travelling through water is ducted and distorted, tending to be concentrated in the so-called 'convergence zones', spaced regularly (about 60 km/37 miles) at intervals from the source. A quiet ship, streaming a passive array at depth, can easily locate a target at this range, and, as modern submarines carry stand-off anti-ship missiles, she needs also an AS weapon to hit the target first at this considerable range. In the *Udaloy*, this weapon is the SS-N-14 'Silex', set in quadruple



Above and below: Perhaps the most impressive of the new generation of Soviet surface warships of destroyer size is the 'Sovremenny' class, built for the surface strike role. Latest American intelligence reports indicate that at least four are operational, with another five on the slipways being built or fitted out. More are expected, with the production run at the Zhdanov shipyard, Leningrad, likely to continue into the next decade to give a final total of between 15 and 20 units for NATO to worry about.







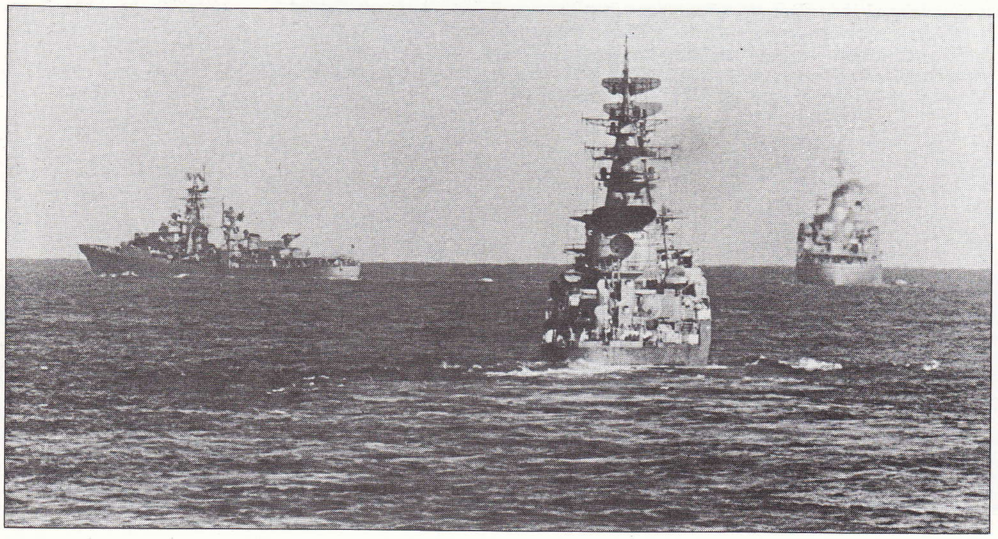
Above: *Photographed by an RAF Nimrod, this 'Kotlin' class destroyer was having a close look at an Esso oil rig off the Orkney islands as part of the Soviet navy's intelligence-gathering role.*

launchers beneath each bridge wing. Although this weapon will almost certainly carry a homing torpedo out to the first convergence zone, it will be inaccurate if targeted only on the data from a passive sonar. If the helicopters are inoperable for the purposes of pinpointing the target, a saturation approach using a nuclear warhead would be attractive to the Soviets.

Dedicated to ASW, the *Udaloy* would probably need the support of another vessel with area-defence SAMs, as she is armed only with vertical-launch SA-N-8 point-defence missiles, probably replacements for the widely-used SA-N-4 'Gecko'.

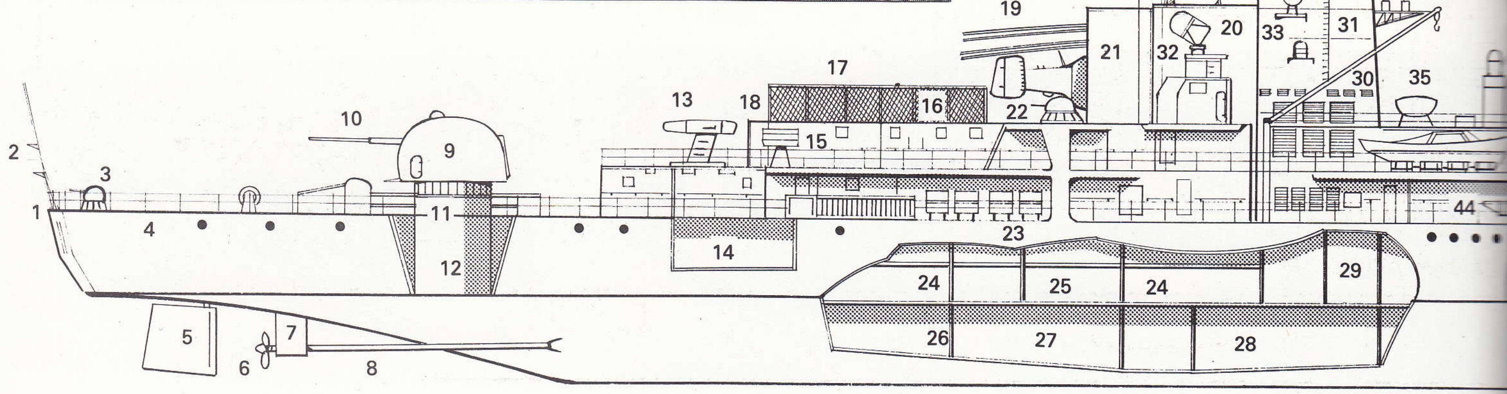
What the Soviets lack at the moment is a modern AAW destroyer, the latest being the 'Kashin' class of 'double-enders', the earliest of which have now been in service for over 20 years armed with the 30-km (18.6-mile) SA-N-1 'Goa'. With the Soviets' first large fixed-wing carrier due to enter service in the late 1980s a new escort can be expected. As one of the 'Kashins' was satisfactorily converted as trials ship for the 30-km (18.6-mile) range SA-N-7 used in the *Sovremenny*, it is possible that further 'Kashins' will be so converted, though this is not common Soviet practice.

A noticeable feature of Soviet ships is their heavy and diverse armament. Even before the Falklands war underlined the vital need of close-in weapons systems (CIWS), they commonly fitted several 30-mm Gatling-type guns. All carry long torpedo tubes that can equally well be employed against either surface or submarine targets. Most can lay mines. The Soviets recognize that their ships will need to defend themselves in order to carry out their tasks and that vessels unable to do this are liabilities.



Below: *A 'Kynda' class missile cruiser and a 'Kanin' class SAM-equipped destroyer practice underway replenishment with a 'Boris Chilkin' class tanker off Hawaii.*

'Sovremenny' class Soviet destroye



Soviet Destroyer Designations

The Soviet navy traditionally had a conventional classification of general-purpose ship types categorized in the Western size terminology as cruisers, destroyers, escorts etc. However, in the latter half of the 1960s there was introduced a new system which reflected the deployment of most Soviet new-build surface ships role as ASW platforms: to the existing classification (see below) were added

(i) anti-submarine cruiser (*protivolodochny kreyser*, or PKR),
(ii) large anti-submarine ship (*bol'shoy protivolodochny korabl'*, or BPK), and
(iii) small anti-submarine ship (*maly protivolodochny korabl'*, or MPK).

The original classification comprised

(a) rocket cruiser (*raketnny kreyser*, or RKR),
(b) cruiser (*kreyser*, or KR)
(c) large rocket ship (*bol'shoy raketnny korabl'*, or BRK),
(d) destroyer (*eskadrenny minonosets*, or EM)
(e) patrol ship (*strorozhevoy korabl'*, or SKR), and
(f) rocket cutter (*raketny kater*, or RKA).

Thus a designation could be applied to every major warship that reflected its combat role. In addition to this the Soviets also use the *rang krablya* (ship rank) classification based on the ship's role, firepower capabilities, displacement and crew size. The ranking assigned gives an idea of the seniority of the ship's commanding officer, the status of the ship's crew and the degree of logistic support that the ship will receive. For the classes given above the rankings are

1st Rank – PKR, RKR and KR,
2nd Rank – BRK, BPK and EM, and
3rd Rank – MPK, SKR and RKA.

In a basic comparison of the Soviet ships designated as destroyer by the Western nations only four out of nine classes actually have the Soviet destroyer designation EM. Of the remainder, four (the 'Kashin', 'Kashin (Mod)', 'Kanin' and 'Udaloy' classes) are classed as BPKs, whilst the 'Kildin' class has the designation BRK. The EM classes range from the classic torpedo- and gun-armed 'Skory' and 'Kotlin' designs through the SAM-equipped conversions of a number of 'Kotlins' to one of the most modern types in the Soviet naval inventory, the 'Sovremenny' classes. This last has been built specifically for the surface strike role, and utilizes a heavy gun battery with a number of supersonic sea-skimming cruise missiles as its main armament. A medium-range SAM system is also carried in order to provide the ship with protection whilst it carries out its primary mission.

In terms of employment these destroyer-sized classes tend to operate as part of surface action or submarine hunter-killer task groups, and on numerous occasions have provided invaluable political support for Soviet foreign policy by visiting third-world countries in out-of-area fleet deployments. Some of the older destroyers have also provided more substantial military support in the form of shore bombardments to help pro-Moscow regimes fighting against rebellious forces, this being particularly true of the Ethiopian conflicts where 'Skory' class destroyers and other Soviet vessels have shelled targets held by Eritrean guerrilla units.

The large anti-submarine ship (BPK) can use its onboard command and control computers to serve as the command ship of a coastal hunter/killer force comprising the larger classes of SKRs. In a typical operation by such a group employing search-and-attack techniques, the smaller SKR units transmit their sonar array outputs to the command ship, which then assesses and collates the information before assigning attack courses and speeds to each individual unit in order to reduce the area of uncertainty of the target's position. As soon as the probability of the target being within a given area is at a maximum, the leader orders the group to concentrate all available RBU rocket-launcher fire within that zone an order to ensure a kill.

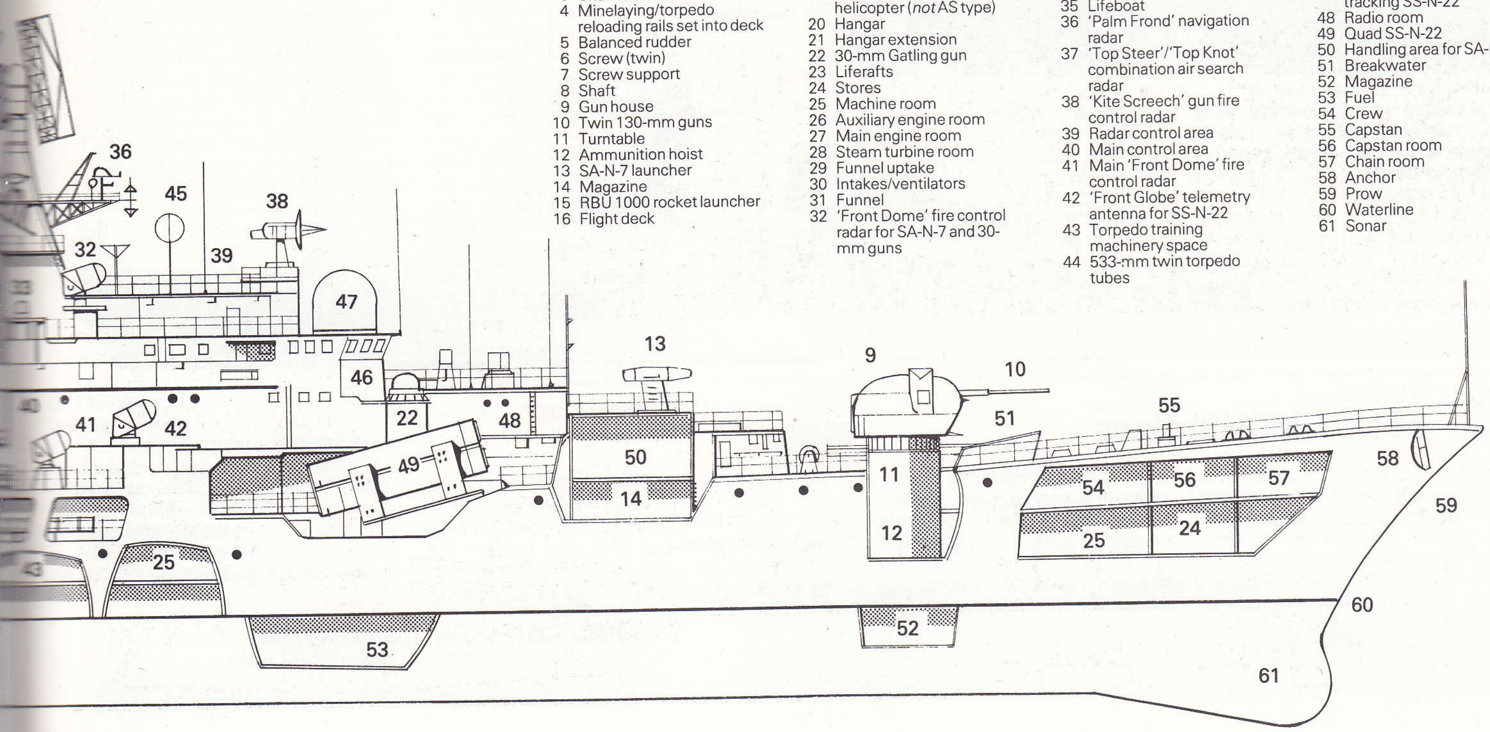
For the open-ocean hunter/killer groups the destroyers take the place of the SKRs and report to ASW command ships of cruiser-size and above. If required the command capabilities of the BPK or EM can be extended to include the control of combined torpedo and missile craft brigades during attacks on enemy surface units, the destroyer-sized vessel acting as the co-ordinator for the overall attack to ensure that the various craft release their weapons in such a manner as to both surprise and to overwhelm any possible defences that may be encountered.

Two of the converted destroyer classes, the 'Kashin (Mod)' BPK and the 'Kildin' BRK, have specialist 'tattletale' roles, for which they carry aft-firing SS-N-2C 'Styx' missiles. In theory this requires the destroyer to follow a high-value enemy surface unit or group of ships in time of tension as a shadowing vessel transmitting continuous updates of the potential targets' course and speed to the headquarters of the Soviets' ocean surveillance system near Moscow for missile-targeting purposes. If war then breaks out a long-range missile strike is launched using the data sent, whilst the 'tattletale' turns away (presenting her stern towards the enemy) and fires her shorter-range 'Styx' missiles to join in the strike. In practice, if the 'tattletale' has been assigned to follow a NATO carrier it usually finds itself with an unwelcome umbrella of attack aircraft, which have the specific job of blowing the ship out of the water should hostilities break out. During the peacetime trailing of NATO surface units by these ships and other destroyers on intelligence-gathering missions, there have been several instances of near misses and collisions, including several that have involved Royal Navy ships. This has not been exactly one-sided, as Western destroyers on similar intelligence missions have also 'accidentally' hit Soviet ships.

For the immediate future the Soviets intend to continue building both the 'Sovremenny' and 'Udaloy' classes at the rate of some four units per year in order to replace less capable ships. This follows the maxim of the commander-in-chief of the Soviet fleet, the legendary Admiral Sergei Gorshkov, that specialist surface ships were to be constructed to fulfil a single role. With the 'Sovremenny' class the designation EM will live on in the Soviet navy, although it will no longer conjure up the picture of the sleek and fast torpedo- and gun-armed Soviet destroyers of the 1950s but rather bring to mind the more sinister missile-equipped vessels that characterize the Soviet fleet of today. New classes to replace both the 'Sovremenny' and 'Udaloy' designs on the slipways in the late 1980s are already believed to be on the drawing boards, and only time will tell what they will look like.

taway drawing key

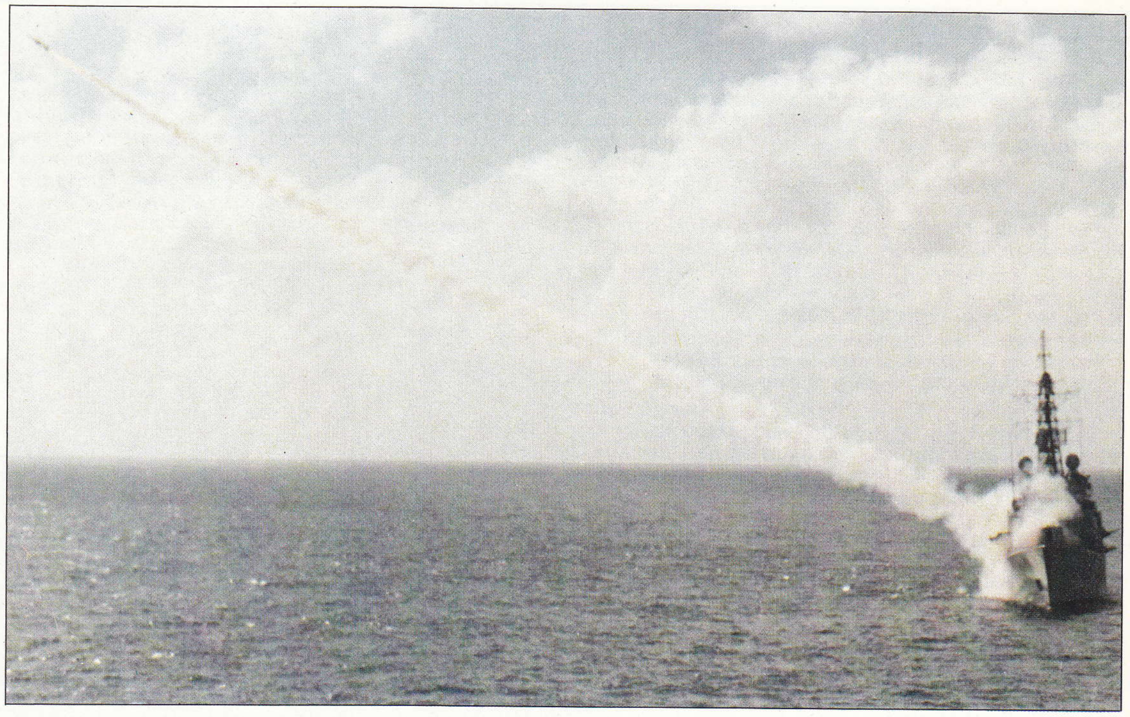
1 Mine release ports
2 Stern lights
3 Chaff launcher
4 Minelaying/torpedo reloading rails set into deck
5 Balanced rudder
6 Screw (twin)
7 Screw support
8 Shaft
9 Gun house
10 Twin 130-mm guns
11 Turntable
12 Ammunition hoist
13 SA-N-7 launcher
14 Magazine
15 RBU 1000 rocket launcher
16 Flight deck
17 Safety nets
18 Blast screen
19 Kamov 'Hormone-B' helicopter (*not* AS type)
20 Hangar
21 Hangar extension
22 30-mm Gatling gun
23 Liferafts
24 Stores
25 Machine room
26 Auxiliary engine room
27 Main engine room
28 Steam turbine room
29 Funnel uptake
30 Intakes/ventilators
31 Funnel
32 'Front Dome' fire control radar for SA-N-7 and 30-mm guns
33 'Fish Bowl' surface target detection radar
34 Crane
35 Lifeboat
36 'Palm Frond' navigation radar
37 'Top Steer'/'Top Knot' combination air search radar
38 'Kite Screech' gun fire control radar
39 Radar control area
40 Main control area
41 Main 'Front Dome' fire control radar
42 'Front Globe' telemetry antenna for SS-N-22
43 Torpedo training machinery space
44 533-mm twin torpedo tubes
45 Radio direction finder
46 Navigation bridge
47 'Band Stand' radome for tracking SS-N-22
48 Radio room
49 Quad SS-N-22
50 Handling area for SA-N-7
51 Breakwater
52 Magazine
53 Fuel
54 Crew
55 Capstan
56 Capstan room
57 Chain room
58 Anchor
59 Prow
60 Waterline
61 Sonar



CANADA

'Iroquois' class

Ordered in 1968 as anti-submarine destroyers, the four **'DDH 280' class** destroyers HMCS ***Iroquois*** (280), HMCS ***Huron*** (281), HMCS ***Athabaskan*** (282) and HMCS ***Algonquin*** (283) are a revised version of the eight Tartar SAM-equipped 'Tribal' class of general-purpose frigates cancelled in 1963. They have the same hull design, dimensions and basic characteristics as the 'Tribals' but have enhanced ASW features such as three sonars, a helicopter flight deck and twin hangar for two licence-built Sikorsky CH-124 Sea King ASW helicopters. The weapons and sensor fit is a mixed bag with an Italian 127-mm (5-in) OTO-Melara Compact gun, two four-rail launchers for the American Sea Sparrow SAM system that retract into a deckhouse in the forward part of the superstructure, Dutch and American electronics, and a British ASW mortar. The last is the ubiquitous triple-barrelled Mk 10 Limbo that fires 175-kg (385-lb) hydrostatic or proximity fused HE projectiles to a maximum range of 900 m (985 yards) and down to depth of 375 m (1,230 ft). The Sea Sparrow system uses a ship-launched version of the AIM-7E Sparrow air-to-air missile, and is reputed to be able to engage targets flying between 15 and 15240 m (50 and 50,000 ft) at ranges from 14.9 km (9.25 miles) to 22.2 km (13.86 miles) depending upon target height. For a new class of helicopter-carrying destroyers due shortly, the *Huron* tested a vertical-launch Sparrow system in 1982. For the embarked helicopters the ships carry both the active acoustic-homing 30 kt Mk 44 5.5 km (3.44-mile) range torpedo with a 34-kg (75-lb) HE warhead for use in shallow waters, and the active/passive acoustic-homing 45-kt 11-km (6.84-mile range) Mk 46 torpedo with a 43.5-kg (96-lb) HE warhead for deep-water work. It is expected that all four ships will be modernized for service into the 1990s.



The 'Iroquois' class destroyer HMCS Huron *(281) launches a Sea Sparrow SAM missile from her starboard side missile rack just forward of the bridge. The design allows for the carriage and operation of two licence-built CH-124 Sea Kings.*

Specification

'Iroquois' class

Displacement: 3,551 tons standard and 4,700 tons full load

Dimensions: length 129.8 m (426 ft); beam 15.2 m (50 ft); draught 4.4 m (14 ft 6 in)

Machinery: two Pratt & Whitney FT4A gas turbines delivering 50,000 shp (37285 kW) and two Pratt & Whitney FT12AH3 cruising gas turbines delivering 7,400 shp (5520 kW), both to two shafts

Speed: 29 kts

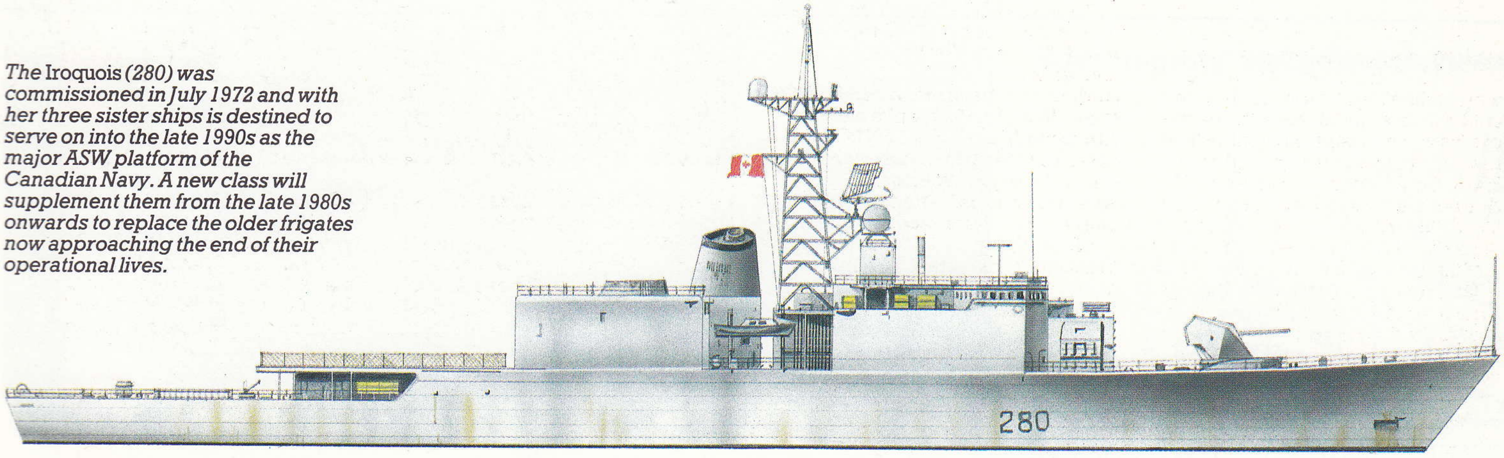
Aircraft: two Sikorsky CH-124 Sea King ASW helicopters

Armament: two quadruple Sea Sparrow SAM launchers (32 missiles), one single 127-mm (5-in) DP gun, one triple-barrel Mk 10 ASW mortar, and two triple Mk 32 324-mm (12.75-in) ASW torpedo tubes (12 Mk 46 torpedoes)

Electronics: one SPS-501 air-search radar, one SPQ2D surface-search and navigation radar, two WM-22 weapon-control radar systems, one URN-20 TACAN, one WLR-1 ECM system, ULQ-6 ECM system, two Corvus chaff launchers, one SQS-505 bow sonar, one SQS-505 variable-depth sonar, and one SQS-501 target-classification hull sonar

Complement: 285

The Iroquois (280) was commissioned in July 1972 and with her three sister ships is destined to serve on into the late 1990s as the major ASW platform of the Canadian Navy. A new class will supplement them from the late 1980s onwards to replace the older frigates now approaching the end of their operational lives.



ARGENTINA

'Meko 360H2' class

Originally to have been a class of six, with four to have been built in Argentina, the **'Meko 360H2' class** design is based on the modularized systems concept whereby each of the weapons and sensor systems carried form a separate modular unit and can be interchanged with a replacement or newer system without the usual reconstruction that otherwise accompanies the modernization of a ship. The final agreement signed with the West German firms of Thyssen Rheinstahl and Blohm und Voss in December 1978 was for four ships to be built in West Germany. All four, the ***Almirante Brown*** (D10), ***La Argentina*** (D11), ***Heroina*** (D5) and ***Sarandis*** (D13), will commission in 1983-4, the first pair having done so in 1983. During the Falklands war the ships were under construction, and the British Rolls-Royce Olympus and Tyne gas turbines which propel them were embargoed for a short time. They are officially classed as frigates, and their near sister is the Nigerian navy's ***Aradu*** (F89), which was ordered in November 1977 as the first warship in the world to use extensive modular prefabrication and containerized weapons in building. She differs from the Argentine vessels in having Otomat Mk 2 SSMs, a single helicopter and a combined diesel or gas turbine (CODOG) propulsion system. The Meko modular building technique has since been extended to smaller frigate designs.

Specification

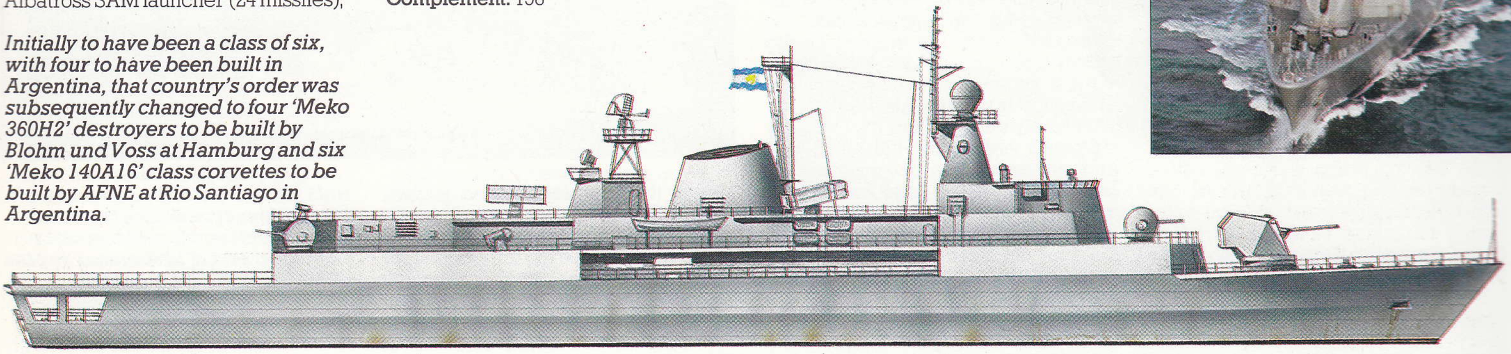
'Meko 360H2' class

Displacement: 3,360 tons full load

Dimensions: length 125.9 m (413 ft

1 in); beam 14.0 m (46 ft); draught 5.8 m (19 ft)
Machinery: four Rolls-Royce gas turbines (two Olympus TM3B and two Tyne RM1C) in COGOG arrangement delivering 51,800 shp (38625 kW) to two shafts
Speed: 30.5 kts
Aircraft: two light ASW type (still to be chosen)
Armament: two twin MM.40 Exocet launcher (no reloads), one octuple Albatross SAM launcher (24 missiles), one single 127-mm (5-in) DP gun, two twin 40-mm AA guns, and two triple 324-mm (12.75-in) ILAS-3 ASW torpedo tubes (18 Whitehead A244/S torpedoes)
Electronics: one DA-08A air- and surface-search, one ZW-06 navigation radar, one WM-25 fire-control system with STIR facilities, one AEG-Telefunken ECM suite, two 20-barrel SCLAR chaff and IR decoy launchers, and one Atlas 80 hull sonar
Complement: 198

Right: The first two of the 'Meko 360' destroyers, Almirante Brown *(D10) and* La Argentina *(D11) undergo sea trials off West Germany. The commissioning of these vessels and their sister ships into the Argentine navy represents a significant increase in its capabilities that will tax the Royal Navy heavily in any future conflict that may break out over the Falkland Islands.*



Initially to have been a class of six, with four to have been built in Argentina, that country's order was subsequently changed to four 'Meko 360H2' destroyers to be built by Blohm und Voss at Hamburg and six 'Meko 140A16' class corvettes to be built by AFNE at Rio Santiago in Argentina.

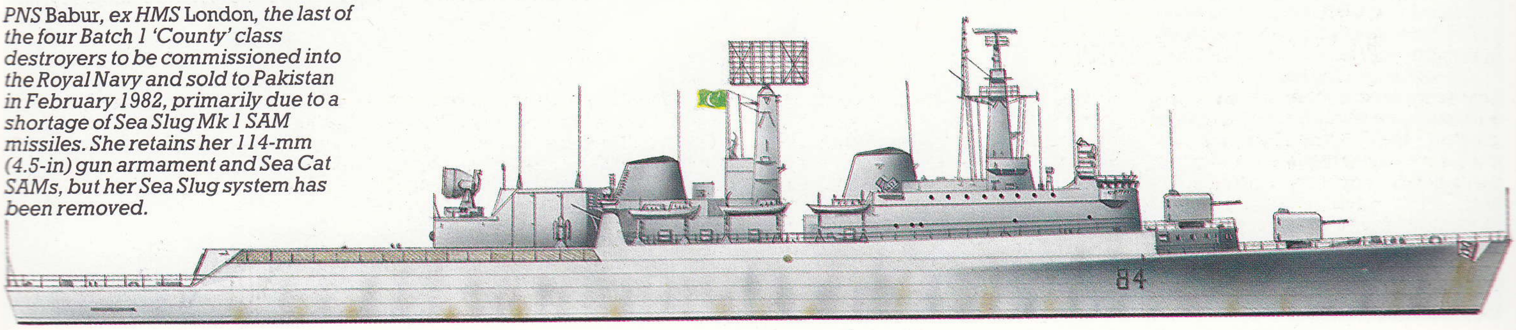
UK

'County' class

The title 'destroyer' was applied to the **'County' class** ships in order to obtain Treasury approval for their construction, but they are little short of guided-missile cruisers. Built around the British first-generation Seaslug beam-riding area-defence SAM system, the 'County' class was ordered in two batches. Of the four **'County Batch 1'** class ships the ***Devonshire, Hampshire*** and ***Kent*** have been deleted from Royal Navy service, whilst the ***London*** was sold to the Pakistani navy as the light cruiser ***Babur*** (C84) without the Seaslug system. The **'County Batch 2'** ships ***Fife, Glamorgan, Antrim*** and ***Norfolk*** were modernized with Exocet missiles in place of one of their two 114-mm (4.5-in) gun mounts and carried the Seaslug Mk 2 SAM with limited SSM capability. All four ships were scheduled to remain in service until the late 1980s because of their extensive command and control facilities, which made them good flagships. HMS *Glamorgan* (D19) and HMS *Antrim* (D18) served with distinction in the Falklands war, the former surviving a direct hit from an MM.38 Exocet and the latter a hit from a bomb which failed to explode. As a result of the 1981 British defence cuts, however, the *Norfolk* had been sold to the Chilean navy as the missile destroyer ***Prat*** (03) whilst the *Fife* (D20) underwent a major refit which kept her out of the war. In February 1984 it was announced that the *Antrim* was to be decommissioned and sold to Chile. The Chileans retain the vessels' Seaslug capabilities and will probably buy up the remaining Seaslug stocks from the UK as the other two 'County' class ships pay off to release trained personnel for new-build ships.

Above: HMS Glamorgan *(D19) following a refit to repair the damage suffered during the Falklands war. Second of the four Batch 2 'County' class destroyers, she now carries a Westland Lynx HAS.Mk 2 helicopter in place of the original Westland Wessex HAS.Mk 3.*

Specification
'County Batch 2' class
Displacement: 6,200 tons standard and 6,800 tons full load
Dimensions: length 158.7 m (520 ft 6 in); beam 16.5 m (54 ft); draught 6.3 m (20 ft 6 in)
Machinery: COSAG arrangement with two geared steam turbines delivering 30,000 shp (22370 kW) and four G.6 gas turbines delivering 30,000 shp (22370 kW) to two shafts
Speed: 32.5 kts
Aircraft: one Westland Lynx HAS.Mk 2 or 3 ASW and surface strike helicopter
Armament: four single GWS Mk 50 MM.38 Exocet SSM launchers (no reloads), one twin Seaslug Mk 2 SAM launcher (30 missiles), one twin 114-mm (4.5-in) DP gun, two quadruple GWS Mk 22 Sea Cat SAM launchers (32 missiles), two single 20-mm AA guns, and two triple 324-mm (12.75-in) STWS1 ASW torpedo tubes (12 Mk 46 torpedoes, only in *Fife* and *Glamorgan*)
Electronics: one Type 965M air-search radar, one Type 992Q air-search and target-designation radar, one Type 901 Seaslug fire-control radar, one Type 278M height-finder radar, two Type 904 Sea Cat fire-control radars, one MRS3 114-mm (4.5-in) fire-control system, one Type 1006 navigation and helicopter-control radar, one ADAWS 1 action information system, one ESM suite, two Corvus chaff launchers, one Type 184 hull sonar, one Type 170B attack sonar, one Type 182 torpedo decoy system, and one Type 185 underwater telephone
Complement: 472



PNS Babur*, ex HMS* London*, the last of the four Batch 1 'County' class destroyers to be commissioned into the Royal Navy and sold to Pakistan in February 1982, primarily due to a shortage of Sea Slug Mk 1 SAM missiles. She retains her 114-mm (4.5-in) gun armament and Sea Cat SAMs, but her Sea Slug system has been removed.*

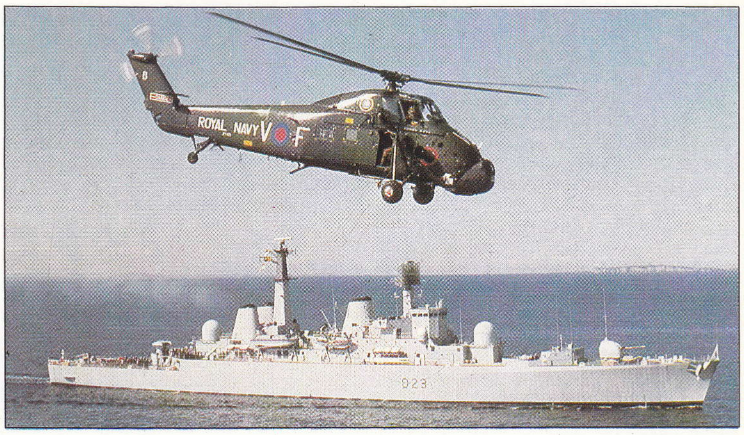
'Type 82' and 'Type 42' classes

Used during the Falklands war, the solitary **'Type 82' class** destroyer HMS ***Bristol*** (D23) was originally to have been the lead ship of a class of four vessels designed for the ASW and area-defence SAM escorts to the 'CVA-01' class aircraft-carriers. With the demise of the carrier project in 1966 the class was cut back to one unit for specific deployment as a trials vessel for the new generation of weapons systems entering British service. The ship has a unique three-funnel configuration for her combined steam and gas turbine propulsion system, and superficially resembles a cleaned-up 'County' class destroyer. The main weapons systems are a twin GWS Mk 30 zero-length Sea Dart SAM launcher and an Ikara ASW missile launcher. The 549-kg (1,210-lb) semi-active radar homing ramjet-powered Sea Dart is an area-defence weapon with a maximum range of 65 km (40 miles) and engagement altitude limits of 30 m (100 ft) and 18290 m (60,000 ft). Although considered by many to be a white elephant, the *Bristol* is in fact a very valuable member of the Royal Navy's surface forces, having the necessary command and control facilities required to act as a flagship and the communications and data links necessary to act as a 'gateway' ship for other RN vessels to communicate through her with NATO ships possessing incompatible communications systems.

With the cancellation of the carriers, a Naval Staff Requirement was issued for a small fleet escort capable of providing area defence. This resulted in the **'Type 42' class** design, which suffered considerably during gestation from constraints that were placed on the dimensions by the Controller of the Navy as a result of Treasury pressure to minimize costs. As built, the ships lacked any significant close-range air-defence systems, had reduced endurance on full power output from their gas turbines (necessitating regular replenishments at sea on operations), and a short forecastle which resulted in a very wet forward section. The main armament comprised the Sea Dart system, but with only half the missile outfit of the *Bristol* and 1950s-technology main radars, which did not exactly enhance their air-defence capabilities. The class was subsequently built in three batches: the **'Type 42 Batch 1'** comprised HMS ***Sheffield***, HMS ***Birmingham*** (D86), HMS ***Cardiff*** (D108), HMS ***Coventry***, HMS ***Newcastle*** (D87) and HMS ***Glasgow*** (D88); the **'Type 42 Batch 2'** consisted of HMS ***Exeter*** (D89), HMS ***Southampton*** (D90), HMS ***Nottingham*** (D91) and HMS ***Liverpool*** (D92); and the **'Type 42 Batch 3'** was made up of HMS ***Manchester*** (D95), HMS ***Gloucester*** (D96), HMS ***York*** (D98) and HMS ***Edinburgh*** (D97). The Batch 3 vessels were lengthened and broadened in an effort to remedy some of the problems encountered in the first two batches.

During the Falklands war four Batch 1 ships (*Sheffield, Cardiff, Coventry* and *Glasgow*) saw action, together with the *Exeter* from Batch 2. Of these the *Sheffield* was hit by an AM.39 Exocet on 4 May 1982 and later sank, the *Glasgow* narrowly missed being blown apart on 12 May by a bomb which passed through her hull amidships from one side to the other without exploding, whilst the *Coventry* sustained three bomb hits on 25 May and sank within forty-five minutes. The lack of any close-range air-defence systems was a significant factor in each case. On the credit side the ships' Sea Dart missiles are officially credited with eight aircraft shot down, although seven seems to be the actual figure secured by some 18 Sea Darts launched from the *Bristol* and the 'Type 42s'. The *Coventry* shot down two McDonnell Douglas A-4 Skyhawks and an Aérospatiale SA 330 Puma helicopter in the days before she was sunk, whilst the *Exeter* was the most successful with two Skyhawks, an English Electric Canberra and a Learjet 35A. The Argentines knew all about the 'Type 42' and its Sea Dart missile system because their navy had bought two vessels of this class from the UK, namely the ***Hercules*** (D1) and the ***Santissima Trinidad*** (D2).

Following the war considerable modifications were made to the British 'Type 42s', with respect particularly to the armament.



HMS* Bristol *was to have been one of a class of four cruiser-size carrier escorts, but the cancellation of the carrier project in 1966 meant that the other 'Type 82s' were not built.

Specification

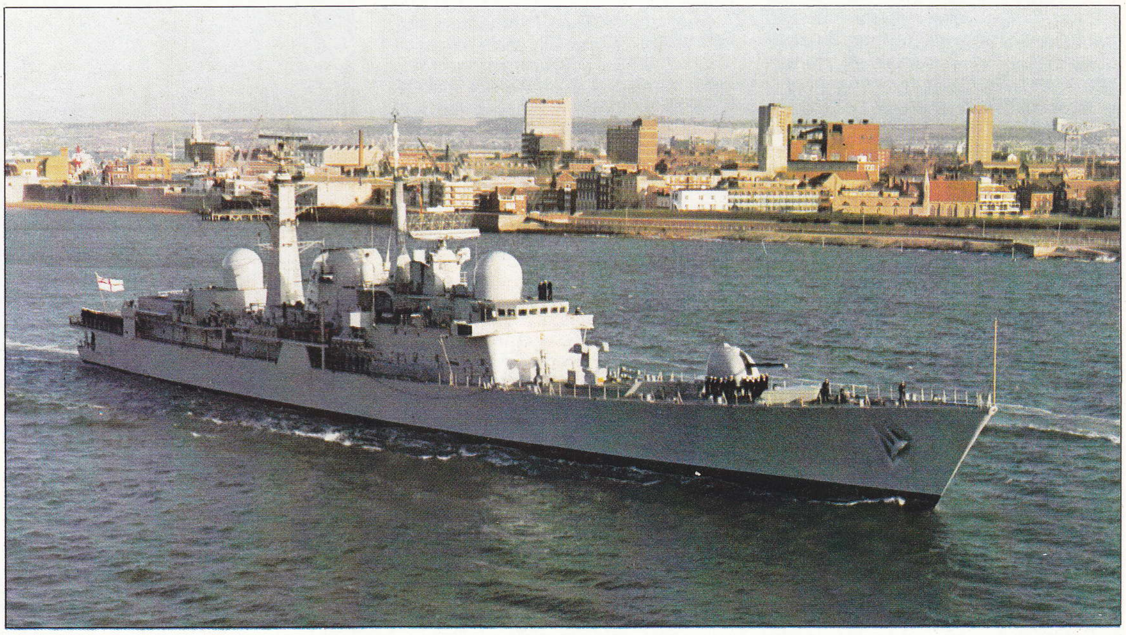
'Type 82' class

Displacement: 6,100 tons standard and 7,100 tons full load

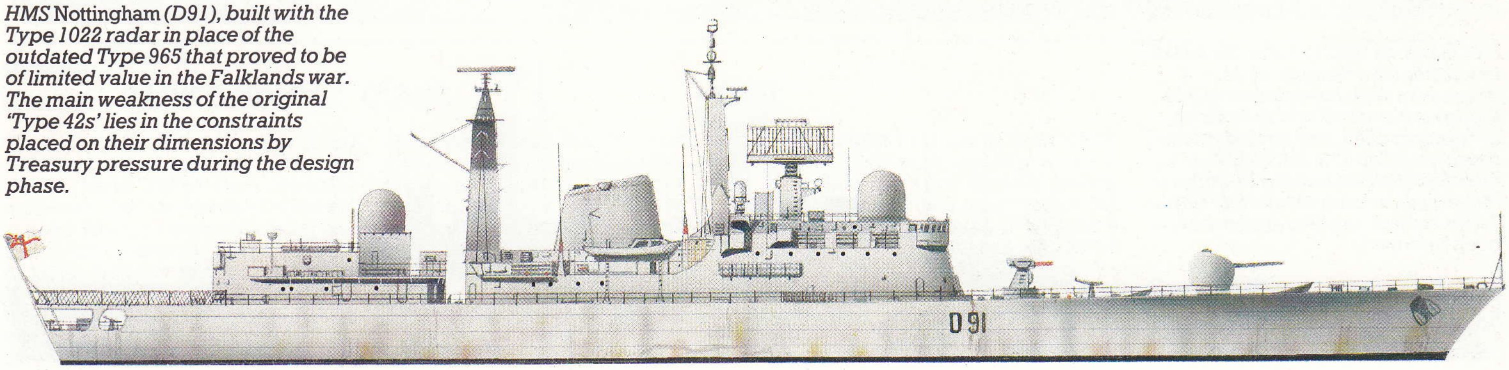
Dimensions: length 154.5 m (507 ft); beam 16.8 m (55 ft); draught 7.0 m (23 ft)

Machinery: COSAG arrangement with two geared steam turbines delivering 30,000 shp (22370 kW) and two Rolls-Royce Olympus TM1A gas turbines delivering 30,000 shp (22370 kW) to

***The first of the stretched 'Type 42s', HMS* Manchester *(D95). These vessels are designed to remedy the shortcomings of the original class by restoring the length cut-off and increasing the beam slightly. However, as originally conceived they would have suffered from the same lack of armament as HMS* Sheffield.**



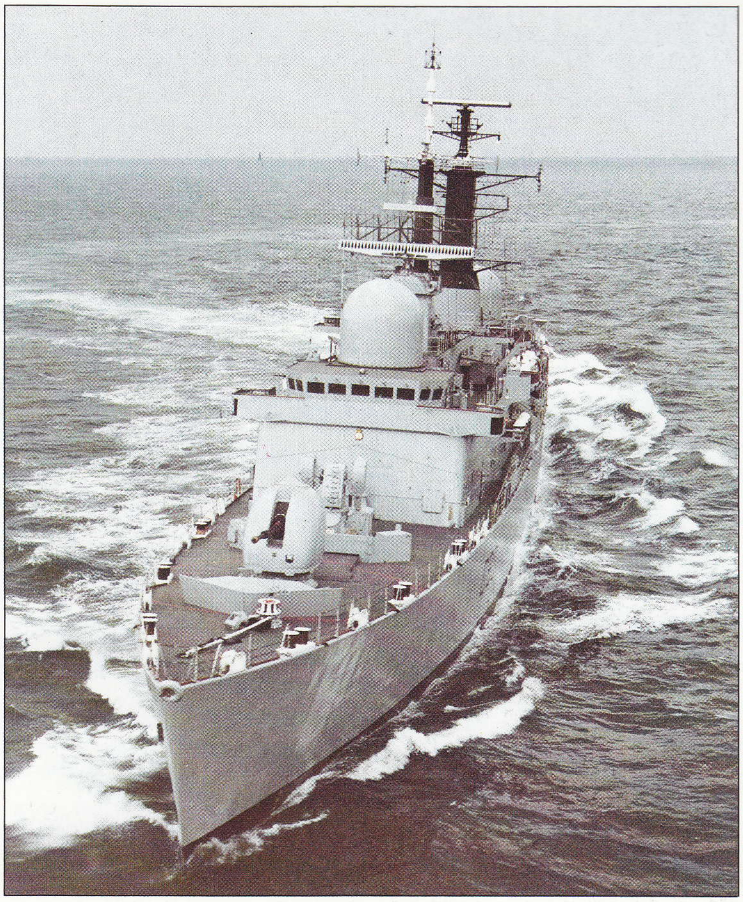
HMS* Nottingham *(D91), built with the Type 1022 radar in place of the outdated Type 965 that proved to be of limited value in the Falklands war. The main weakness of the original 'Type 42s' lies in the constraints placed on their dimensions by Treasury pressure during the design phase.



two shafts
Speed: 28 kts
Aircraft: helicopter landing pad only
Armament: one twin GWS Mk 30 Sea Dart SAM launcher (40 missiles), one single 114-mm (4.5-in) DP gun, two single 20-mm AA guns, one GWS Mk 40 Ikara ASW missile system (20 missiles), and one triple Mk 10 Limbo ASW mortar
Electronics: one Type 965 air-search radar, one Type 992Q air-search and target-designation radar, two Type 909 Sea Dart fire-control radars, one Type 1006 navigation and helicopter-control radar, two Ikara fire-control radars, one ADAWS 2 action information system, one Abbey Hill ESM suite, two Corvus chaff launchers, two SCOTT satellite communications systems, one Type 184 medium-frequency hull sonar, one Type 162 classification sonar, one Type 182 torpedo decoy system, one Type 185 underwater telephone, and one Type 170 Limbo attack sonar
Complement: 407

Specification
'Type 42 Batch 1' and 'Type 42 Batch 2' classes
Displacement: 3,850 tons standard and 4,350 tons full load
Dimensions: length 125.6 m (412 ft); beam 14.3 m (47 ft); draught 5.8 m (19 ft)
Machinery: COGOG arrangement with two Rolls-Royce Olympus TM3B gas turbines delivering 56,000 shp (41760 kW) and two Rolls-Royce Tyne RM1A gas turbines delivering 8,500 shp (6340 kW) to two shafts
Speed: 30 kts
Aircraft: one Westland Lynx HAS. Mk 2 or 3 ASW and surface strike helicopter
Armament: one twin GWS Mk 30 Sea Dart SAM launcher (20 missiles), one single 114-mm (4.5-in) DP gun, two twin 30-mm AA guns, four single 20-mm AA guns, and two triple 324-mm (12.75-in) STWS 1 ASW torpedo tubes (12 Mk 46 torpedoes)
Electronics: one Type 965R air-search radar (Type 1022 in Batch 2 and being retrofitted to Batch 1), one Type 992Q or Type 992R air-search and target-designation radar, two Type 909 Sea Dart fire-control radars, one Type 1006 navigation and helicopter-control radar, one ADAWS 4 action information system (ADAWS 7 in Batch 2), one UAA1 Abbey Hill ESM suite, two Corvus chaff launchers, two SCOTT satellite communications systems, one Type 184M medium-frequency hull sonar, one Type 162M classification sonar, one Type 182 torpedo decoy system, and one Type 185 underwater telephone
Complement: 301

Specification
'Type 42 Batch 3' class
Displacement: 4,775 tons standard and 5,350 tons full load
Dimensions: length 141.1 m (462 ft 9 in); beam 14.9 m (49 ft); draught 5.8 m (19 ft)
Machinery: as 'Type 42 Batches 1 and 2'
Speed: 31.5 kts
Aircraft: as 'Type 42 Batches 1 and 2'
Armament: as 'Type 42 Batches 1 and 2' except 40 missiles for Sea Dart system, and the possibility of fitting Lightweight Sea Wolf SAM system in place of one Type 909 radar is being explored
Electronics: as 'Type 42 Batches 1 and 2' except one Type 1022 air-search radar, one ADAWS 8 action information system, and one Type 2016 multi-frequency hull sonar
Complement: 312

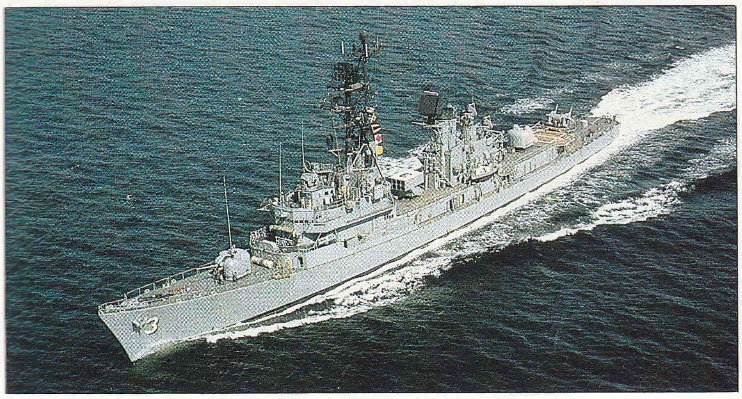


HMS* Southampton *(D90) in June 1983. Since the Falklands war most 'Type 42s' have had additional close-range air defence guns fitted, and augment these with at least four General Purpose Machine Guns fitted to the bridge wings for use in high-threat areas.

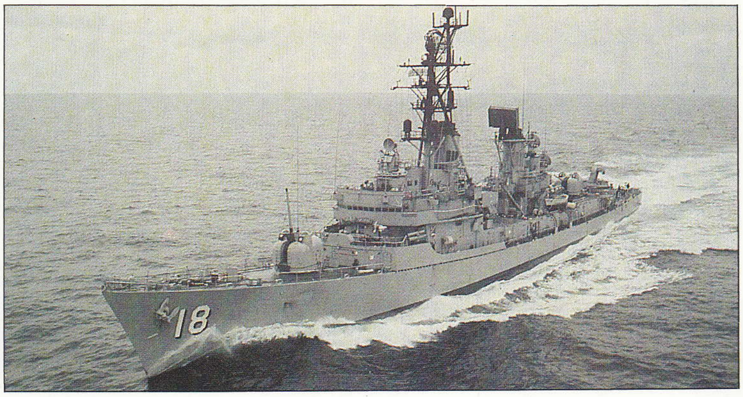
USA

'Charles F. Adams' class

Guided-missile destroyers of the **'Charles F. Adams' class** are currently in service with the Australian navy in the form of HMAS ***Perth*** (D38), HMAS ***Hobart*** (D39) and HMAS ***Brisbane*** (D41) with the West German navy in the form of the ***Lütjens*** (D185), ***Mölders*** (D186) and ***Rommel*** (D187), and with the US Navy (23 ships). Each version differs from the others, the Australian ships having two single-rail Ikara ASW missile launchers amidships with 32 missiles in place of the ASROC launcher, and the German vessels having combined funnel and radar mast layout. They are excellent sea boats and are considered to be very capable multi-purpose vessels. All 23 American ships were due to receive extensive midlife refits but due to massive cost increases this has had to be limited to six ships, the USS ***Conyngham*** (DDG 17), USS ***Tattnall*** (DDG 19), USS ***Goldsborough*** (DDG 20), USS ***Benjamin Stoddart*** (DDG 22), USS ***Richard E. Byrd*** (DDG 23) and ***Waddell*** (DDG 24), with the other 17 due for deletion from the late 1980s onwards. the 'Charles F. Adams' class was built to a revised 'Forrest Sherman/Hull' design to accommodate either a single- or twin-rail Tartar SAM launcher system. Since completion some units have been fitted with a four-round ASROC reload magazine on the starboard side alongside the forward funnel. The modernized vessels will have a three-computer NTDS action data system, an integrated combat system, more modern sensors and countermeasures equipment, and the Standard SM-2MR missile. The ships which are not being modernized are the USS ***Charles F. Adams*** (DDG 2), USS ***John King*** (DDG 3), USS ***Lawrence*** (DDG 4), USS ***Claude V. Ricketts*** (DDG 5), USS ***Barney*** (DDG 6), USS ***Henry B. Wilson*** (DDG 7), USS ***Lynde McCormick*** (DDG 8), USS ***Towers*** (DDG 9), USS ***Sampson*** (DDG 10), USS ***Sellers*** (DDG 11), USS ***Robison*** (DDG 12), USS ***Hoel*** (DDG 13), USS ***Buchanan*** (DDG 14), USS ***Berkeley*** (DDG 15), USS ***Joseph***



One of the best of the earlier missile ship designs, the 'Charles F. Adams' class were at first equipped with a twin Mk 11 Tartar SAM system, as seen here on USS* John King *(DDG3) here.



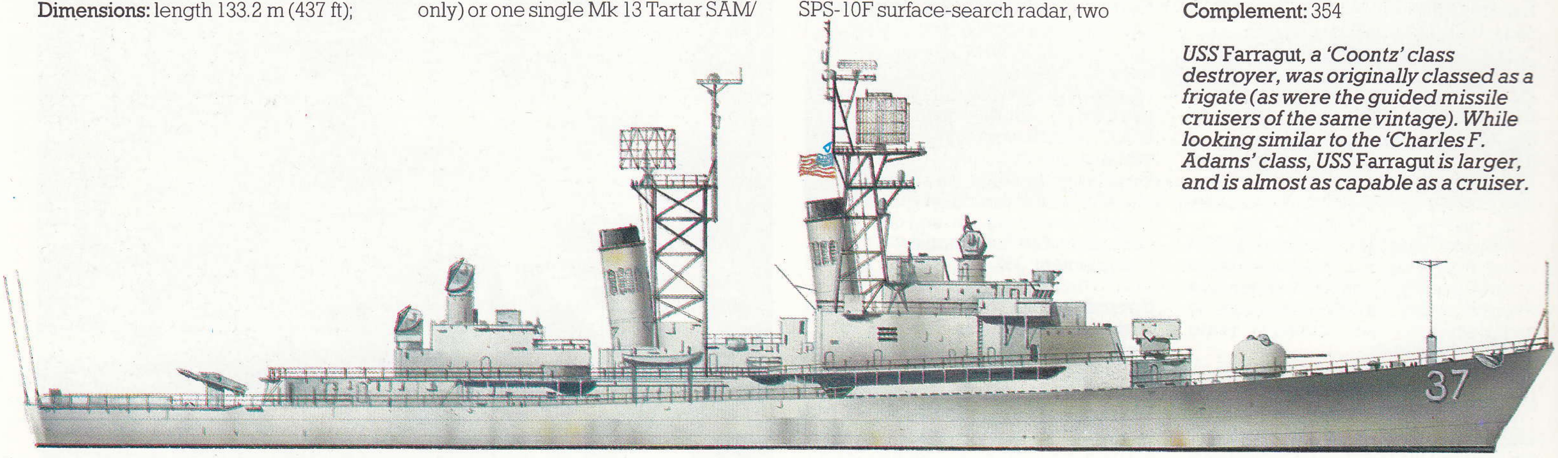
The last 10 'Charles F. Adams' class vessels, including USS* Semmes *(DDG 18), were equipped with the single-rail Mk 13 Tartar SAM launcher. It was this sub-class that attracted the attention of the Australian and West German navies.

'Charles F. Adams' class (continued)

Strauss (DDG 16), USS ***Semmes*** (DDG 18), and USS ***Cochrane*** (DDG 21). The vessels in the other two navies have already been modernized for service into the 1990s.

Specification
'Charles F. Adams' class (US Navy)
Displacement: 3,370 tons standard and 4,526 tons full load
Dimensions: length 133.2 m (437 ft); beam 14.3 m (47 ft); draught 6.1 m (20 ft)
Machinery: two geared steam turbines delivering 70,000 shp (52200 kW) to two shafts
Speed: 31.5 kts
Aircraft: none
Armament: one twin Mk 11 Tartar SAM/Harpoon SSM launcher (36 Tartar and 6 Harpoon, in DDG 2-14 only) or one single Mk 13 Tartar SAM/Harpoon SSM launcher (36 Tartar and 4 Harpoon, in DDG 15-24 only), two single 127-mm (5-in) DP guns, one octuple ASROC ASW missile launcher (4 reloads in some ships), and two triple Mk 32 324-mm (12.75-in) ASW torpedo tubes (6 Mk 46 torpedoes)
Electronics: one SPS-39A 3 D radar, one SPS-40B (DDG 2-14) or SPS-37 (DDG 15-24) air-search radar, one SPS-10F surface-search radar, two SPG-51C Tartar fire-control radars, one SPG-53A 127-mm (5-in) fire-control radar, one URN-20 (URN-25 in DDG 11-16) TACAN, one WLR-6 ECM system, one ULQ-6B ECM system, two Mk 36 Super RBOC chaff launchers, one SQS-23A bow sonar (DDG 20-24), one SQQ-23 PAIR hull sonar (DDG 2-19), and one Fanfare torpedo decoy system
Complement: 354

USS Farragut*, a 'Coontz' class destroyer, was originally classed as a frigate (as were the guided missile cruisers of the same vintage). While looking similar to the 'Charles F. Adams' class, USS* Farragut *is larger, and is almost as capable as a cruiser.*

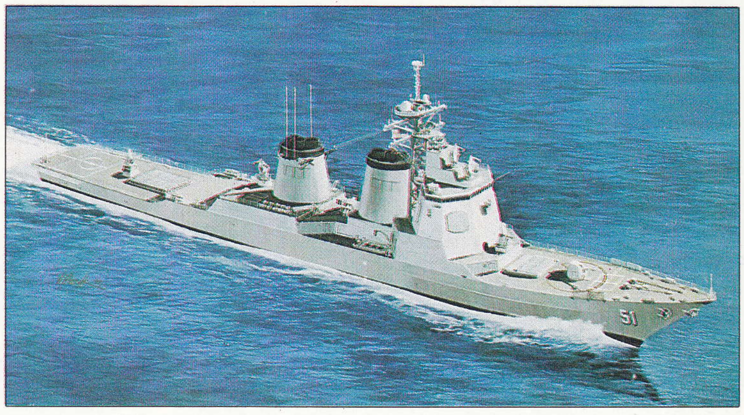


USA

'Arleigh Burke' class

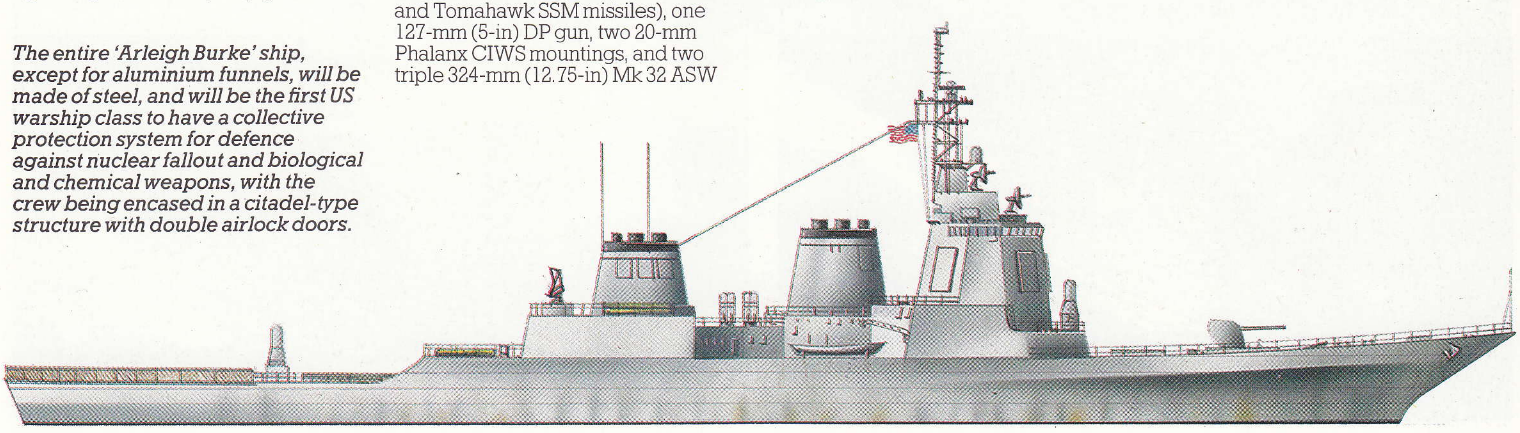
Designed as the gas turbine-powered replacement for the 'Coontz' guided-missile destroyer class and the 'Leahy' and 'Belknap' classes of missile cruisers from the early 1990s, the **'Arleigh Burke' class** will be less capable than the contemporary 'Ticonderoga' class missile cruisers in the anti-air warfare role but will also have a secondary anti-surface ship role assigned to them. Apart from aluminium funnels each ship will be constructed from steel to prevent any recurrence of the USS *Belknap*'s fire damage when she collided with the carrier USS *John F. Kennedy*. Plastic Kevlar armour will be fitted over all vital machinery and operations room spaces whilst, surprisingly enough, the class will also be the first US warship class to be equipped fully for warfare in a nuclear, chemical or biological (NBC) environment with the crew confined in a citadel located within the hull and superstructure. The main sensors will be a pair of the reduced-capability SPY-1D AEGIS radars, with the new Seafire fire-control system to provide laser designator facilities for the guidance of 127-mm (5-in) shells fired from the single lightweight 127-mm (5-in) gun mount. The Mk 32 self-defence torpedo tubes will be the first to employ the Mk 50 Barracuda Advanced Lightweight Torpedo now under development. At least 60 vessels (DDG 51 onwards) are planned, the lead ship taking the name USS *Arleigh Burke*, although the final number will be subject to much Congressional debate as costs rise. One point of criticism already raised is that no hangar has been provided for a helicopter although a flightdeck for a Sikorsky SH-60B Seahawk ASW helicopter is part of the design.

Specification (provisional)
'Arleigh Burke' class
Displacement: 8,200 tons standard and 8,500 tons full load
Dimensions: length 142.1 m (466 ft); beam 18.3 m (60 ft); draught 7.6 m (25 ft)
Machinery: four General Electric LM2500 gas turbines delivering 100,000 shp (74570 kW) to two shafts
Speed: 32 kts
Aircraft: helicopter landing pad only
Armament: two quadruple Harpoon SSM launchers (no reloads), two vertical-launch missile systems (90 Standard SM-2MR SAM, ASROC ASW and Tomahawk SSM missiles), one 127-mm (5-in) DP gun, two 20-mm Phalanx CIWS mountings, and two triple 324-mm (12.75-in) Mk 32 ASW torpedo tubes (14 Mk 50 torpedoes)
Electronics: two SPY-1D paired AEGIS radars, one SPS-10 surface-search radar, three SPG-62 Standard fire-control radars, one Seafire fire-control system, one Mk 99 fire control system, one SLQ-32(V)2 ESM suite, two Mk 36 Super RBOC chaff launchers, one SQS-53C bow sonar, and SQR-19 towed-array sonar
Complement: 307



Artist's impression of the new 'Arleigh Burke' (DDG51) class of destroyers. To be armed with vertical-launch SAM systems, they will use the AN/SPY-1D version of AEGIS, and are expected to supplement the 'Ticonderoga' class of missile cruisers in the anti-air warfare role as replacements for the 'Coontz/Leahy/Belknap' classes.

The entire 'Arleigh Burke' ship, except for aluminium funnels, will be made of steel, and will be the first US warship class to have a collective protection system for defence against nuclear fallout and biological and chemical weapons, with the crew being encased in a citadel-type structure with double airlock doors.



NATO and American destroyers - a contrast

The massive economic power of the United States enables the US Navy to acquire large, specialized vessels in some numbers. In contrast, the smaller NATO nations (including the UK) cannot afford to spend so much, and smaller vessels have to serve more purposes to less effect.

When any comparison is made of the latest American destroyers and comparable ships in the NATO Fleets one factor readily becomes apparent: the Americans have vessels that are basically more capable in all respects save that of nuclear, biological and chemical (NBC) warfare defence. This is primarily the result of the US Navy's ability to spend a large amount of money on the construction of significant numbers of hulls, and then on the provision of the weapons and sensors that their role requires. This is in stark contrast with the position of those NATO nations which operate destroyers: these countries can usually build only a small number of hulls, which can then be provided with systems that are usually below the standard and numbers actually required in order to keep down construction costs. A graphic example of this was the vulnerability of the British 'Type 42' destroyers in the Falklands conflict.

In fact it is possible to foresee a time in the not too distant future when of all the NATO navies only the Americans will be able to afford destroyers, the rest having to rely on vessels of frigate size or less. Already some NATO nations, such as the Netherlands, have gone this way by phasing out or selling a large number of elderly destroyers and replacing them with a smaller number of frigates. As this process gains ground so the number of ships in each individual navy declines and its overall combat capabilities gradually decrease, a fact which most politicians tend to ignore or to gloss over when they discuss such subjects. For instance, the current reduction in the number of the Royal Navy's surface fleet, including the paying off of several 'County' class destroyers after a relatively short operational life, can only result in a reduced availability of warships to perform adequately the tasks political expediency gives them to perform, which is all the more surprising when this number has increased as politically sensitive trouble spots such as the Gulf War and the recent disturbances in Lebanon have shown. Surprisingly, in this respect, the Americans are actually increasing their surface fleet numbers with new ship construction, including additional 'Spruance' class ASW destroyers and the new 'Arleigh Burke' class of air defence destroyers, this growth more than balancing the loss of less capable ships as they are retired. This means that the US Navy will be able to increase the number of tasks it can perform at one time whilst at the same time being considerably more effective in undertaking those tasks which have already been assigned to it.

A major reason for this apparent about-turn in fortunes of the British and US navies over recent years is that the US Navy has at last managed to determine just what is required of it within the policies laid down by its political masters, and then to have this politico-military framework mapped out and translated by its strategists and planners into terms of ship types, numbers and capabilities, which has then become the blueprint for the current US Navy ship construction programme. Unfortunately the same cannot be said for the Royal Navy as the material its planners and strategists work on tends to change as fast as every new defence review can be undertaken; thus no constructive framework can be formed, although the politicians of course say otherwise. Both navies within the context of their long-term planning strive for cost effectiveness as far as possible with their destroyers, but to all intents and purposes it is the Americans who have the greater success. The 'Spruance' class destroyers were initially criticized as being underarmed for their size, though they have since proved to be the best ASW platforms that NATO deploys, and will be rearmed with systems that smaller destroyers would not be able to carry. The futuristic 'Arleigh Burke' class units will almost certainly prove to be the best air-defence destroyer yet built, and the current 'Kidd' class ships are without doubt the most heavily armed general-purpose destroyer so far constructed. The contemporary British destroyer design, the 'Type 42', which is intended primarily for air defence, is considered by many to be more akin to a guided-missile frigate than a destroyer, even in its stretched form to improve stability. It may be this factor that has led to the export of only two British destroyers in recent years, whereas the Americans have sold a few more, especially of its highly successful 'Charles F. Adams' design.

For the future salvation of the less well-off NATO navies (including the Royal Navy) the answer may well lie in the West German concept of constructing warships with containerized weapon and sensor systems to reduce both the initial building and operational mid-life refit costs. Such a modular construction technique has already been used in building a number of destroyers, frigates and smaller warships for countries in Africa and South America which would otherwise have had difficulties in affording new construction warships of a more conventional nature. Another way might be for a number of NATO navies to get together to build a large number of hulls in one batch at a suitable single yard, and then adopt the containerized weapons and sensor outfit approach to equip them to the individual requirements of each service. This would cut out the extra expense that each country incurs in designing and building its own ships, and would be highly cost-effective. However, whichever method finally appears as the best solution it is almost certain that internal political considerations within the NATO countries involved will torpedo such a programme, thus leaving the European NATO countries without a class of ship that was originally conceived there.

The British 'Type 42' destroyer was, for economic reasons, the smallest hull which could handle the Sea Dart missile systems, with the natural result that when additional weapons were required they could not be fitted without seriously affecting the stability of the ship.

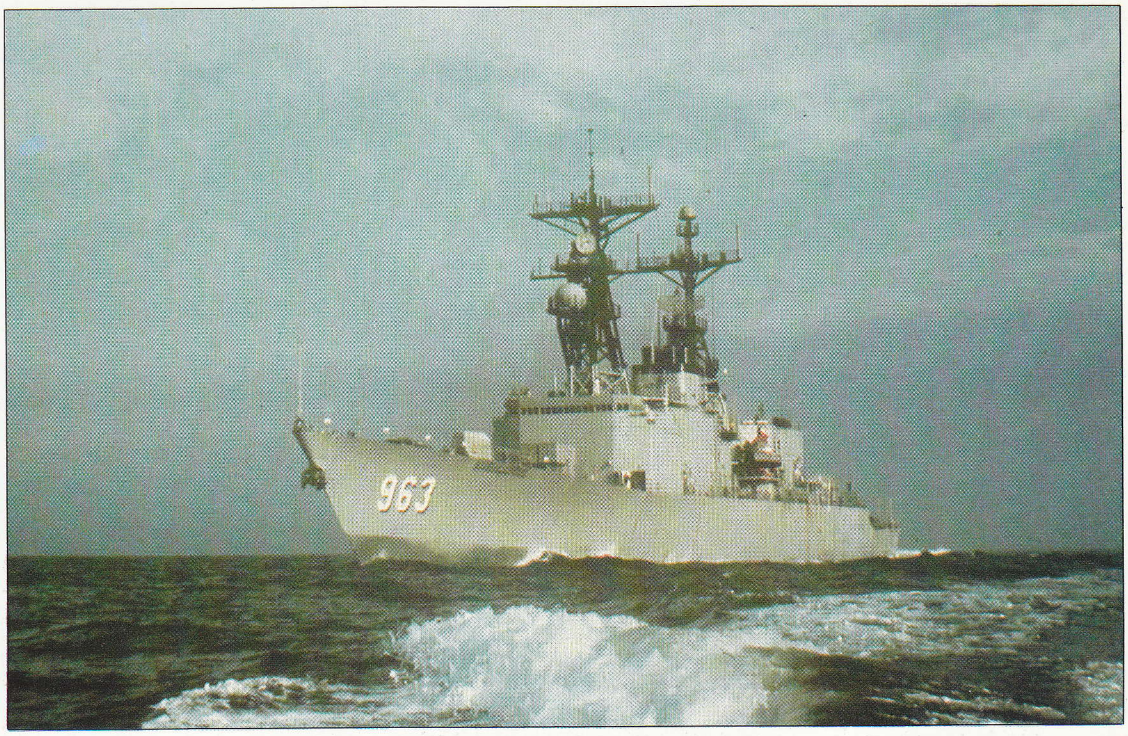
In contrast, the large 'Spruance' class destroyers such as USS Kinkaid had plenty of room for extra or replacement systems, and contrary to early opinions have proved to be excellent ASW vessels, as well as forming the basis for the highly capable AEGIS air defence cruisers.

USA

'Spruance' and 'Kidd' classes

Built as the replacements for the many 'Gearing (FRAM I)' class destroyers, the 31-strong **'Spruance' class** is the most capable ASW surface ship class yet built, so much so that construction of the class is to resume in the late 1980s to replace the 'Forrest Sherman' and 'Hull' classes in the early 1990s. Constructed by the modular assembly technique, whereby large sections of the hull are built in various parts of the shipyard then welded together on the slipway, these were the first large US warships to employ all gas-turbine propulsion. The ships are due to be refitted with 61-round vertical launch missile units from 1985 onwards. The active/passive SQS-53 low-frequency sonar carried in the large bow dome is capable of operating in both the short-range direct-path and the long-range bottom-bounce and convergence-zone modes, targets at long ranges being engaged by the ASW helicopters carried aboard. The current units of the 'Spruance' class are the USS ***Spruance*** (DD 963), USS ***Paul F. Foster*** (DD 964), USS ***Kinkaid*** (DD 965), USS ***Hewitt*** (DD 966), USS ***Elliott*** (DD 967), USS ***Arthur W. Radford*** (DD 968), USS ***Peterson*** (DD 969), USS ***Caron*** (DD 970), USS ***David R. Ray*** (DD 971), USS ***Oldendorf*** (DD 972), USS ***John Young*** (DD 973), USS ***Comte de Grasse*** (DD 974), USS ***O'Brien*** (DD 975), USS ***Merrill*** (DD 976), USS ***Briscoe*** (DD 977), USS ***Stump*** (DD 978), USS ***Conolly*** (DD 979), USS ***Moosbruger*** (DD 980), USS ***John Hancock*** (DD 981), USS ***Nicholson*** (DD 982), USS ***John Rodgers*** (DD 983), USS ***Leftwich*** (DD 984), USS ***Cushing*** (DD 985), USS ***Harry W. Hill*** (DD 986), USS ***O'Bannon*** (DD 987), USS ***Thorn*** (DD 988), USS ***Deyo*** (DD 989), USS ***Ingersoll*** (DD 990), USS ***Fife*** (DD 991), USS ***Fletcher*** (DD 992), and USS ***Hayler*** (DD 997).

In 1974 the government of Iran ordered six SAM-equipped versions of the 'Spruances' for service in the Persian Gulf and Indian Ocean. However, following the revolution in that country two were cancelled in 1979 whilst the remaining four under construction were taken over by the US Navy as the **'Kidd' class**. These are the world's most powerfully armed general-purpose destroyers, and are unofficially known in the US Navy as the **'Ayatollah' class**. The four ships were commissioned as the USS ***Kidd*** (DDG 993), USS ***Callaghan*** (DDG 994), USS ***Scott*** (DDG 995) and USS ***Chandler*** (DDG 996).



Lead ship of the 31-strong 'Spruance' class is USS* Spruance *(DD963). She is first large US warship to be fitted with an all-gas turbine propulsion system. The class was built by Ingalls Shipbuilding Corporation under the modular assembly technique, and has proved to be the best ASW destroyer type yet built.

Specification

'Spruance' class

Displacement: 5,826 tons standard and 7,800 tons full load

Dimensions: length 171.7 m (563 ft 3 in); beam 16.8 m (55 ft 2 in); draught 8.8 m (29 ft)

Machinery: four General Electric LM2500 gas turbines delivering 80,000 shp (59655 kW) to two shafts

Speed: 33 kts

Aircraft: two Kaman SH-2D/F Seasprite LAMPS Mk I helicopter or one Sikorsky SH-3H Sea King ASW helicopter

Armament: two quadruple Harpoon SSM launchers (no reloads, and not in DD 964 and DD 965), two quadruple Tomahawk SSM launchers (no reloads, and for DD 963, DD 964, DD 969, DD 972, DD 979, DD 984, DD 985, DD 988, DD 989 and DD 993 only), one octuple Sea Sparrow SAM launcher (24 missiles), one octuple ASROC ASW missile launcher (24 missiles), two single 127-mm (5-in) DP guns, two 20-mm Phalanx CIWS mountings (being fitted), and two triple 324-mm (12.75-mm) Mk 32 ASW torpedo tubes (14 Mk 46 torpedoes)

Electronics: one SPS-40B air-search radar, one SPS-55 surface-search radar, one SPG-60 fire-control radar, one SPQ-9A fire-control radar, one Mk 91 Sea Sparrow fire-control system, one Mk 86 gun fire-control system, one Mk 116 ASW fire-control system, one SLQ-32(V)2 ESM suite, two Mk 36 Super RBOC chaff launchers, one SQS-53 bow sonar, one SQR-19 towed-array sonar, one SATCOMM communications system, and one Fanfare torpedo decoy system

Complement: 296

Specification

'Kidd' class

Displacement: 6,210 tons standard and 9,200 tons full load

Dimensions: length 171.6 m (563 ft); beam 16.8 m (55 ft); draught 9.1 m (30 ft)

Machinery: as 'Spruance' class

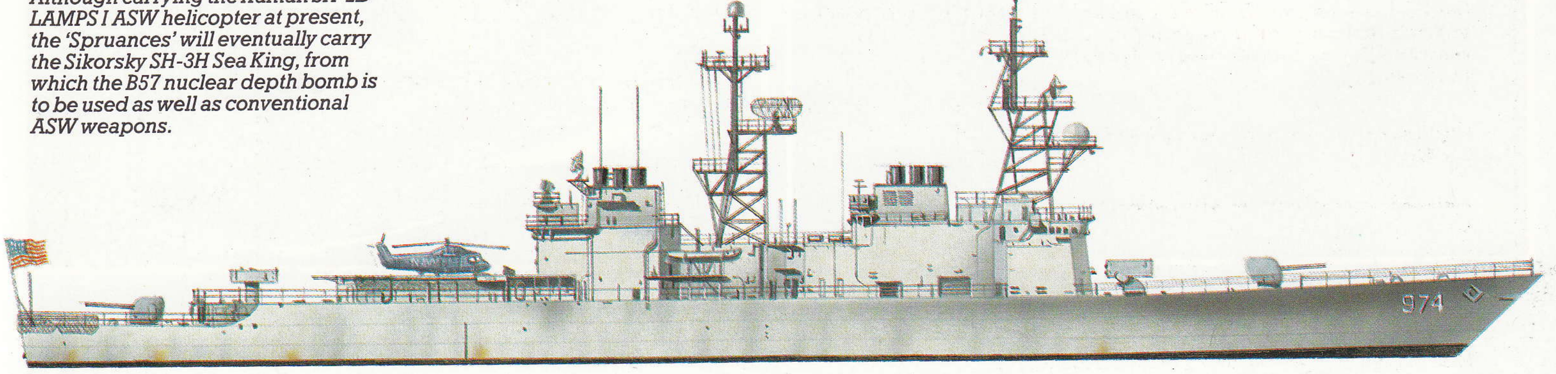
Speed: 32 kts

Aircraft: two Kaman SH-2D/F Seasprite LAMPS Mk I or two Sikorsky SH-60B Seahawk LAMPS Mk III helicopters

Armament: two quadruple Harpoon SSM launchers (no reloads), two twin Mk 26 Standard SM-1ER SAM/ASROC ASW missile launchers (50 Standard, 16 ASROC and 2 test missiles), two single 127-mm (5-in) DP guns, two 20-mm Phalanx CIWS mountings, two triple 324-mm (12.75-in) Mk 32 ASW torpedo tubes (14 Mk 46 torpedoes)

Electronics: one SPS-48C 3D radar, one SPS-55 surface-search radar, two SPG-51D Standard fire-control radars, one SPG-60 fire-control radar, one SPQ-9 fire-control radar, two Mk 86 gun fire-control systems, one Mk 116 ASW fire-control system, one URN-20 TACAN, one SLQ-32(V)2 ESM suite, two Mk 36 Super RBOC chaff launchers, one SQS-53 bow sonar, one SQR-19 towed-array sonar, and one Fanfare torpedo decoy system

Complement: 338



USS* Comte de Grasse *(DD974). Although carrying the Kaman SH-2D LAMPS I ASW helicopter at present, the 'Spruances' will eventually carry the Sikorsky SH-3H Sea King, from which the B57 nuclear depth bomb is to be used as well as conventional ASW weapons.